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Industrial Technology

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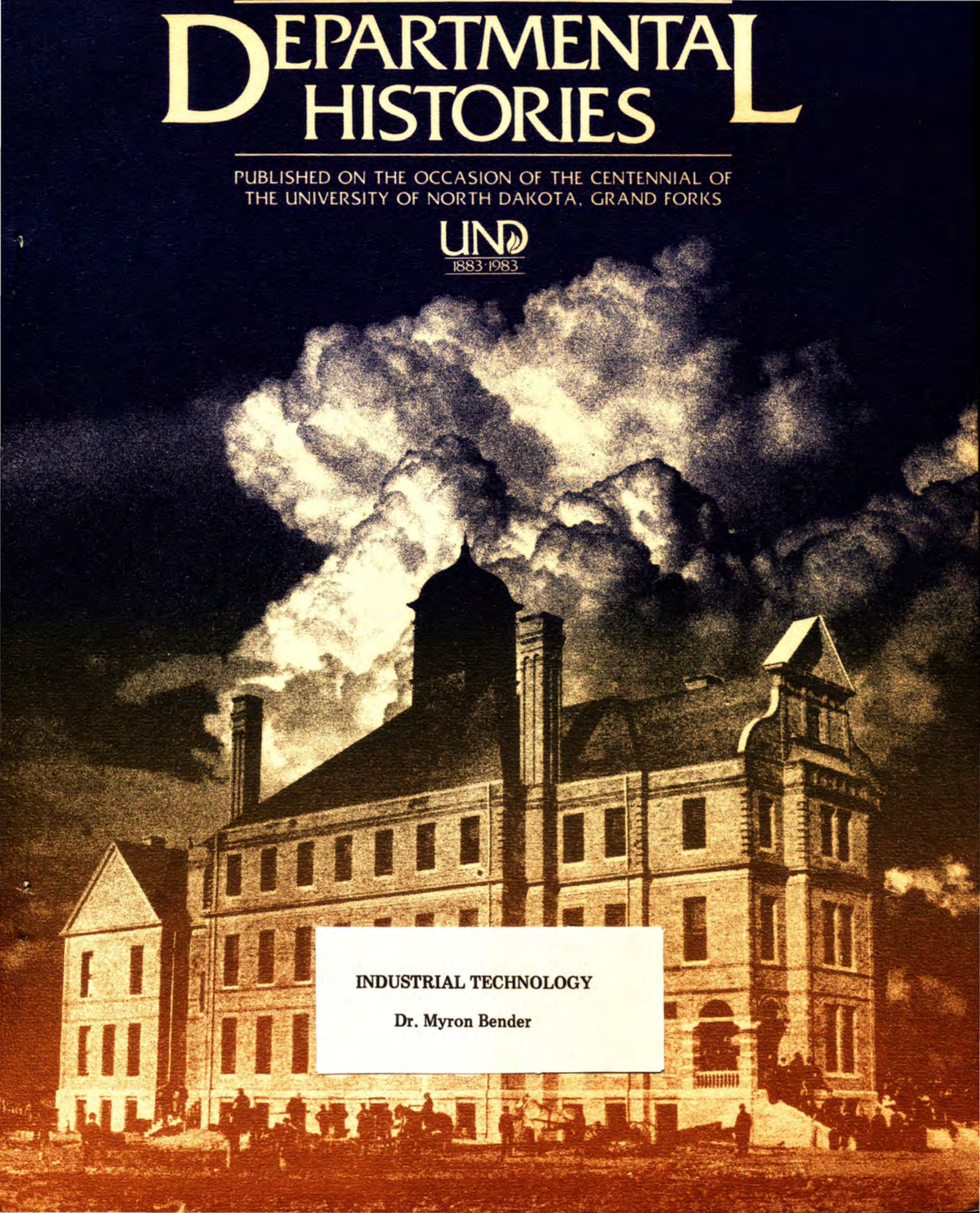
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DEPARTMENTAL HISTORIES

PUBLISHED ON THE OCCASION OF THE CENTENNIAL OF
THE UNIVERSITY OF NORTH DAKOTA, GRAND FORKS

A large, multi-story industrial building, likely a mill or factory, with a prominent central tower and multiple chimneys. The building is constructed of brick or stone and has many windows. In the foreground, there are silhouettes of people and horse-drawn carriages, suggesting a historical setting. The sky is filled with dramatic, dark clouds, and the overall tone is sepia or aged. A white rectangular box is superimposed over the lower part of the building, containing the title and author information.

INDUSTRIAL TECHNOLOGY

Dr. Myron Bender

A BRIEF HISTORY OF THE DEPARTMENT OF INDUSTRIAL TECHNOLOGY

...There are, however, three main roads along which we can proceed with good hope of advancing towards the best balance of intellect and character: These are the way of literacy culture, the way of scientific culture, and the way of technical culture. No one of these methods can be exclusively followed without grave loss of intellectual activity and of character...

--Alfred North Whitehead, *The Aim of Education* (New York: The Macmillan Company, 1929).

Early Movements of Industrial Education at the National Level

Industrial Technology and Industrial Arts educational programs established in this country were derived from three distinct educational movements in Europe. These were: (1) The Russian System of Tool Instruction, (2) The Swedish Sloyd System, and (3) The English Arts & Crafts Movement. The three programs developed during the latter part of the nineteenth century had significant influence on the growth of industrial education in the United States as it progressed from Manual Training to Manual Arts to Industrial Arts.

During the first part of the nineteenth century a technical instructional system was developed in Russia for the training of engineers and technicians. It was revolutionary in that it employed a class type of training in contrast to the apprentice method. This was officially launched in 1830 with the establishment of the School of Trades and Industries in Moscow. At the same time a system of educational handwork was being developed in the Scandinavian countries, to be known as the Swedish Sloyd System. The instruction for this program concentrated upon the making of articles that were useful in the school and home.

These two systems and the British Arts and Crafts movement found their way to the United States during the latter part of the nineteenth century. The three European programs, influenced by an expanding American industrialization, developed into a type of educative shopwork which was shortly to be known as Manual Training.

American pioneers of the establishment of manual training programs were Professor C. W. Woodward of the Engineering Department of Washington University in St. Louis, and Dr. John D. Runkle, President of Massachusetts Institute of Technology. These two individuals viewed a display of the "Russian System of Tool Instruction" exhibited at the Philadelphia Centennial in 1876. This exhibit might have gone unnoticed by others but Dr. Runkle and Woodward, who had been searching for a means of expressing a new idea in education, saw in this modest display the practical solution of what they felt was the need of all industrial education. The graded system of exercises provided a vehicle for coordinated training of hand and eye and illustrated a type of applied learning. Accordingly the first Manual Training School appeared in 1881 as part of Washington University in St. Louis. The instructional programs that were developed included specific occupational crafts of the day: woodworking, patternmaking, iron chipping and filing, forge work, brazing and soldering, the use of machine tools and mechanical drawings.

Manual Training Era at the University of North Dakota

American educators experimented with the various European movements and devised numerous variations and combinations of these. Both Woodward and Runkle considered their concept of classroom shopwork, introduced at the Collegiate level, as an equal in all aspects of the other academic subjects. They advocated that Manual Training was not to be taught as a trade but rather a general education. Dr. Runkle had observed that the few students who entered the mechanical engineering course at MIT with a knowledge of shopwork readily secured positions upon graduation, while the large number who had not had shop experience found it difficult to enter upon professional work without first taking one or two years of apprenticeship. To solve this problem, a group of "instruction shops" were established that became known as the "School of Mechanic Arts". He went even beyond the Mechanic Arts laboratories when he said "at the same time, I believed that this discipline could be made a part of general education, just as we make the sciences available for the same end through laboratory instruction".

These early philosophies led to the offering of special courses in the Applied Sciences at the University of North Dakota. The 1901-02 catalog included a two-year program on practical training for various industries. These special courses in the Applied Sciences were offered "for the benefit of young men and women of North Dakota whose work on the farm or in the shop prevents their spending the time necessary to complete a full college course but whose aspirations prompt them to secure as far as possible an education which will fit them for many of the exigencies of daily life while it gives them an insight into the important applications of science to the various industries".

In offering the "special courses in applied sciences", the emphasis was on practical work along with the scientific aspects of each subject in such a way as to make the study both "educational and useful". For those students who were unable to secure a more extended college education, these brief courses in applied science proved highly helpful in acquainting them with a broader and more scientific basis for farm life, business life or the life of an artisan in rural North Dakota.

While the importance of practical training was emphasized in these courses the disciplinary value was not lost sight of. The object was to add to mental discipline training of the eye and hand as well as to cultivate habits of accuracy, industry and skill. The program was largely based upon laboratory instruction in the sciences, shop work, such as engine practice, wood and iron working, and blacksmithing for young men. The specific two-year course in the Applied Science for men included:

Course A.

First Year.

First Term--

Blacksmithing or Machine Repairing or Mechanical Drawing.
Bookkeeping.
General Chemistry.
Vegetable Physiology.

Second Term--

Blacksmithing or Machine Repairing or Mechanical Drawing.
Bookkeeping.
General Chemistry.
Elementary Human Physiology.

Third Term--

Blacksmithing or Machine Repairing or Mechanical Drawing.
Bookkeeping.
General Chemistry.
Structural Botany.

Second Year.

First Term--

Steam Engine or Shop Work or Mechanical Drawing.
Business Practice.
Chemistry of Soils or Foods.
Economic Botany.

Second Term--

Steam Engine or Shop Work or Mechanical Drawing.
Business Practice.
Chemistry of Soils or Foods.
Economic Botany.

Third Term--

Steam Engine or Shop Work or Mechanical Drawing.
Business Law.
Chemistry of Soils or Foods.
Economic Botany.

In addition to the above curriculum, a student could substitute with the consent of the faculty any of the following subjects: Civics, English, Physics and Electricity, Music, Mathematics, History, and other subjects.

Students who selected the two-year special course in the Applied Sciences and later desired to complete a college curriculum could, with the consent of the faculty, substitute the work taken in these courses for work in the college curriculum as far as they were equivalent.

The 1903-04 University of North Dakota Catalog listed Calvin H. Crouch as the Manual Training instructor under the faculty for the Normal College. The Normal College was an integral part of the University by charter from the Territorial Assembly in 1883. It was established to prepare public school teachers. There was no specific program listed for Manual Training under the Normal College but courses were included under Mechanical and Electrical Engineering and taught by the faculty of the engineering departments. Shop Work, as it was being referred to by the engineering departments included the following courses:

SHOP WORK

Woodworking. In the woodworking shop the students are taught the care and use of the tools of the carpenter and the patternmaker and

to perform all the ordinary operations of these mechanics. Special attention is paid to pattern-making.

Moulding. In the moulding shop the students are taught the various methods of moulding simple and complex patterns. The work includes green sand, sweep moulding and core work. By this means the student becomes familiar with the requirements and possibilities of the foundry.

Blacksmithing. In the blacksmithing shop, which is an ideal forge shop, the students are taught to handle the various tools and to make all kinds of welds and forgings in iron and steel and to become familiar with the processes of tempering, case hardening, annealing, and tool dressing. Each student concludes his course by making a set of lathe and planer tools to be used when he begins work in the machine shop.

Machine Shop. In the thoroughly equipped machine shop the student becomes familiar with the machine and hand tools of the machinist, and is enabled to perform all operations with which this mechanic is familiar.

Mechanical Drawing. Mechanical freehand and instrumental drawing and tracing.

In addition to the above practical courses, a Manual Training course was added in 1906. This course was also offered through the Engineering Departments and consisted of "joinery, woodturning, cabinet making and blacksmithing" as an elective for preparatory and liberal arts students. Mr. Arthur C. Hargrave was the Manual Training instructor and Professor Becker was responsible for the mechanical drawing course.

A specific program of studies in Manual Training was offered through the Teachers College (formally known as the Normal School) in 1909. This program was designed to prepare teachers. The director was Professor Tasso Lindsey who received his degree from Bradley Polytechnic Institute.

Manual Training

Education, general and special	20 hours
Psychology, and Ethics or Logic	8 hours
Manual Training, including work in both wood and iron	16 hours
English 1 and 2, and elective	12 hours
History, Political Science or Economics	8 hours
Physical Science	8 hours
Foreign language	16 hours
Public Hygiene	2 hours
Physical Culture	3 hours
Library Science	1 hour
Electives	31 hours
	125 hours

The 1909-10 University Catalog included the following statement and specific course description:

Manual Training

Every effort is made to maintain a model manual training department in the belief that thereby a valuable service is rendered to every progressive high school in the state. The following three courses are offered, each requiring five hours of shop work a week and counting as a "half course".

Course I. Joinery and Cabinet Making. Students are taught the proper use and care of the carpenter's and cabinet-maker's tools by means of a series of graduated exercises in joinery followed by a course in the application of joinery to the making of furniture and cabinets of different kinds. The use of wood stains and polishes.

Course II. Wood Turning and Pattern Making. This course covers exercises planned to give familiarity with both turners' and pattern makers' work and introduces the lathe and other power machinery.

Course III. Forging. The processes of working iron and steel are taught, together with their application in practical work. The basic operations of forge practice through making a number of exercise pieces and finished articles.

The manual Training program was merged with the mechanical drawing program in 1910. The teacher training portion was moved from the Mechanic Arts Building to Woodworth Hall. The Manual Training program for the preparation of teachers expanded rapidly under the able leadership of Professor Lindsey who brought recognition of the program to the professional level of other teacher education programs. For example the 1912-13 catalog noted:

The history of the manual training movement in Europe with its development in the United States; the relation of the subject to other subjects of the school curriculum; the preparation of the manual trainer and his duties as such; courses of study in the elementary, grammar, and high school.

(1912-13)

MANUAL TRAINING AND MECHANICAL DRAWING

Manual Training

1 and 2. Woodworking

Mr. Lindsey

Four credits. Five hours a week. First and second semesters. This is a shop course giving a thorough drill in the use and care of carpenter's and cabinet-maker's tools with a view to the preparation of the student for teaching the subject of manual training.

In the first semester the work consists of exercises in joinery, together with the making of interesting and useful models. During the second semester the work is continued with an application of joinery in the making of smaller pieces of furniture.

- 3 and 4. Advanced Woodworking. Mr. Lindsey
Four credits. Five hours a week. First and second semesters.
Prerequisite: Manual Training 1 and 2, or equivalent.

This advanced shop course is designed to give further training to students who are prepared to teach this subject in the public school.

This first semester includes a study of the more difficult joints, more advanced work in furniture construction and cabinet making, the use of power machinery and methods of wood finishing. The second semester includes practice in the different woodturning cuts, the making of woodturning models, and the elements of patternmaking.

5. Materials and Methods in Woodworking. Mr. Lindsey
Two credits. Two hours a week. First semester.

This course includes a survey of lumbering, sawmilling, and seasoning of lumber with visits to yards and mills when possible; a study of the use and care of tools; equipment and care of the shop; use of the common joints in types of wooden structures; principles of joining; wood finishing.

152. Theory and Practice of Teaching Manual Training in Secondary Schools Mr. Lindsey

Two credits. Two hours a week. Second semester.

Open only to students who have completed Manual Training 1, 2, 3, 4 and 5, save that, by permission, it may be taken in conjunction with 4, by strong students.

Mechanical Drawing

- 1 and 2. Mechanical Drawing for Teachers. Mr. Lindsey
Four credits. Five hours a week and outside work. First and second semesters.

A course giving a thorough and practical drill in the elements of mechanical drawing. The work includes lettering, use of conventions, sketching, geometrical problems, revolutions, development of surfaces, intersection of surfaces, and working drawing of shop problems.

- 3 and 4. Advanced Mechanical Drawing for Teachers. Mr. Lindsey
Four credits. Five hours a week and outside work. First and second semesters.

Open to students who have completed Courses 1 and 2, or equivalent.

The work includes isometric drawings, cabinet projection, more advanced working drawings, machine details, tracing and blue-printing.

- 151 and 152. Theory and Practice of Teaching Mechanical Drawing in Secondary Schools.

Mechanical Engineering. Shop Work

- 4a. Forge Work Mr. Willey
Two credits. Six hours a week. Second semester.
In this course the student is taught to handle the tools of the blacksmith and to make various kinds of welds and forgings in iron and steel. (Identical with Shop Work 4, College of Mechanical and Electrical Engineering).
- 5a. Forge Work and Tool Dressing Mr. Willey
Two credits. Six hours a week. First semester.
This work includes advanced forging in iron and steel, the dressing of machine shop tools, and the tempering and annealing of steels. It also includes case-hardening and some machine shop vise work. (Identical with Shop Work, 5, College of Mechanical and Electrical Engineering).

The Manual Arts Era

The Manual Arts followed in the path of Manual Training. The term became popular as national leaders advocated broadening the activities of Manual Training and placing emphasis on the aesthetic approach to hand work. Professor Charles A. Bennett from Columbia University was much concerned with the advancement of the machine age and thereby the possibility of a national loss of hand skill and artistry with materials. In 1919 he wrote a book--The Manual Arts--and in it described a proposal for a system of education bearing the same title. The theme of the book was on the effects of the development of industry on living:

A very important result of this development in the industries is the need of men with a wider knowledge of the materials and processes of industry and the principles upon which the processes and the use of the materials rest. This knowledge is not being handed down from father to son to any great extent, nor from master to apprentice, partly because the factory system does not easily lend itself to education, and partly because the knowledge needed is so new that even the masters themselves find it difficult to keep up with the development. But then need for a wider knowledge of the principles and processes of industry is not confined to the workers in these producing industries. Every man who would intelligently use the modern conveniences of his home, or the labor-saving devices and conveniences of business life, must know something of the materials and principles of industry; and if he is to have any adequate appreciation of the product--if he is to judge the quality of the things he purchases or uses, he must know something of the process that produced it. In fact, industrial development has been so rapid and so varied in our country--it has affected every man's life to such an extent that if he is to retain sufficient mastery of his environment to make it serve his needs, he is forced to acquire considerable practical knowledge of the materials, principles and processes of industry. And if the school is to furnish it, the school must be equipped with the tools of industry.

The University of North Dakota kept pace with the national trends. Three years prior to Dr. Bennett's book, *The Manual Arts*, 1919-- , the UND Manual Training Department was renamed and became the Department of Manual Arts. The new program was directed by Professor Vernon E. Sayre (A.B., College of Emporia; Special Certificate, Bradley Institute) and was housed in Woodworth Hall. The UND 1916-17 catalog included the following statement:

Manual Arts

The Department of Manual Arts is maintained for the purpose supplying a training (a) to those who wish to equip themselves for teaching this line of work in the public schools, (b) to students who desire to enrich the traditional program of liberal study by one or more such courses as are here announced. Those expecting to teach may take either the two year course preparing for a special certificate to teach manual training, or they may choose four year course. It is recommended that all men preparing many school authorities expect their male teachers to give instruction in manual training along with other subjects.

In addition to changes in the content for the courses that had been offered previously under Manual Training, courses were added in Art & Design and Printing. The printing courses were taught by Professor Sayre. The courses included the fundamental processes of printing. Students were given practical experiences in composition, proofreading, correction, and distribution of type matter, imposition, and presswork. A small paper was published which gave extended practice in the setting of type along with miscellaneous work to provide experience in the designing and execution of simple job work. In later years, the printing part of the program was taught by the Department of Journalism.

In 1923, Professor E. W. Bollinger became Head of the Manual Arts Department. Professor Bollinger had received a B.S. degree in Wisconsin and a M.S. degree from Ohio State University. He served as Head of the Manual Training Department and later the Industrial Arts Department from 1923-1935.

The Manual Arts program progressed under the able leadership of Professor Bollinger and numerous curriculum changes were made to keep abreast with a changing society. The 1923-24 UND catalog included the following four year curriculum under the School of Education:

Curriculum for Major in Manual Arts

Freshman Year:

(1) English (rhetoric and literature)	10
(2) Science	8
(3) Sociology and history (English or American)	4 to 8
(4) Woodworking	8
(5) Elective	8
(6) Physical education and military science (for men)	1½ to 4

Sophomore Year:

(1) Science (the remainder of requirements)	8
(2) Social science (history, and economics or political science)	4 to 8
(3) General psychology	3
(4) Introduction to education or educational psychology	3
(5) Elective	6
(6) Advanced woodworking and mechanical drawing	8
(7) Physical education and military science (for men)	4

Junior Year:

(1) Secondary education or problems in el. education	3 to 6
(2) Education (elective)	4
(3) Requirements of minor	4
(4) Advanced mechanical drawing, and everyday mechanics or forging and machine shop	8
(5) Electives	12

Senior Year:

(1) History of education or principles of education	3
(2) Requirements of minor	4
(3) Theory and practice	4
(4) Problems and processes	4
(5) Design (art department)	2
(6) Electives	(about) 15

The mission and specific courses offered through the Department of Manual Arts as of 1926 included the following:

Manual Arts E. W. Bollinger, Assistant Professor

The courses in the department of Manual Arts are arranged (a) to train supervisors and teachers of Industrial Education, and Manual Arts for the public schools, (b) to furnish Industrial Education and Vocational Education and Manual arts to those students training to be principals and superintendents, and (c) to offer elective courses to general students in the College of Liberal Arts.

Students expecting to teach manual arts should follow the sequence of courses as outlined under School of Education, curriculum for a major in manual arts. Other students may choose manual arts as their major or minor subject.

1a and 1b. Woodworking

Mr. Bollinger
and Assistant

Sec I. Bench Work.

Four credits: five hours a week, first and second semesters.

A beginning course in bench woodworking, in which the fundamental tool processes are applied in the making of useful

articles. The shop work is accompanied by a study of forestry, lumbering, seasoning of lumber, wood technology, and finishing methods. Students should have credits or registration in mechanical drawing 7.

Sec. II. Art Fibre Construction.

Four credits: six hours per week, first and second semesters.

A course in the weaving and construction of art fibre furniture.

This course is of special value to teachers of smaller and rural schools because of the adaptability of the material for schools with limited equipment and space.

3a and 3b. Advanced Woodworking

Mr. Bollinger

Four credits: five hours a week, first and second semesters.

This course includes advanced training in the design and construction of furniture, in the operation of woodworking machines, and in the more difficult methods of wood finishing. Some time is devoted to woodturning.

4b. Carpentry

Mr. Bollinger

Two credits: five hours a week, second semester.

Prerequisite: Manual Arts 1a, 1b, and 3a. This course is intended to give the student a working knowledge of the best practices in house carpentry and to illustrate them in suitable constructions. The work embraces: floor, wall, and roof (gable and hip) framing; the setting of door and window frames, outside finish and siding; and a study of lumber, nails, hardware, and the steel square.

5a and 5b. Problems and Processes in Manual Arts

Mr. Bollinger

Four credits: two to three hours a week, first and second semesters.

This course is intended for teachers and should be taken in conjunction with the course in the theory and practice of teaching. It consists of the organizing and systematizing of subject matter as involved in construction work, wood finishing, furniture design, mechanical drawing, and care of equipment.

Required of students majoring in Home Economics.

This course, although intended primarily for teachers, may be taken as an elective by general students. It is not a course in architectural engineering. By means of a few definite and practical problems, it aims to develop some skill in elementary architectural drawing and in the reading of simple plans and working drawings. The work includes planning and designing according to specifications of a simple dwelling involving floor plans, elevations, and detail drawings. Students majoring in manual arts may substitute this course for 9b.

11a and 11b. Elementary Printing

Mr. Bollinger
and Assistant

Four credits: five hours a week, first and second semesters.

This is a course treating with the fundamental processes of printing. The student is given practical experience in

composition, proofreading, correction, and distribution of type matter, imposition and presswork. A study is made of the point system and its use in the print shop. A small paper is published which gives quite extended practice in the setting of type, while enough miscellaneous work is done to give experience in the designing and execution of simple job work.

14b. Organization and Supervision of Manual Arts Mr. Bollinger

Two credits: two hours a week, second semester.

The purpose of this course is to acquaint students preparing to become superintendents and principals of city schools and of rural consolidated schools with the types and the organization of manual arts subjects. It may also be taken by students preparing to teach manual arts as a desirable supplement to courses 155a and 155b. The work includes a discussion of manual arts courses suitable to urban and rural communities; their evaluation, contents, aims, objectives, and methods; the lay-out of shops; the selection and buying of equipment and supplies; the preparation and qualifications of teachers; the improvement of teachers in service; the vocational aspects of the manual arts; vocational guidance; exhibits.

6a and 6b. Every Day Mechanics Mr. Bollinger

Four credits: six hours a week, first and second semesters.

This course consists of the following four distinct units of intensive training, each 9 weeks in length: (1) Elementary Electrical Wiring; (2) Elementary Sheet Metal Work; (3) Elementary Forging; (4) Automobile Repair Work. The course is given in cooperation with the College of Engineering. It intends to give to manual arts teachers a broader point of view and a preparation more adequate for the manual arts work in the small community than is possible in a shop course limited to woodworking alone. The content of the course will have direct bearing on rural conditions.

7a and 7b. Mechanical Drawing For Teachers Mr. Bollinger
and Assistants

Four credits: five hours a week and outside work, first and second semesters.

A course giving thorough and practical drill in the elements of mechanical drawing. The work includes perspective and orthographic sketching, pencil mechanical drawing, the making of working drawings, and some tracing. Emphasis is placed also upon lettering, conventions, and the correct use of instruments.

9a and 9b. Advanced Mechanical Drawing For Teachers Mr. Bollinger

Four credits: five hours a week and outside work, first and second semesters.

Prerequisite: Manual Arts 7a and 7b, or equivalent. Advanced working drawings, detail sketches, detail mechanical, assembly and isometric drawings, tracings and blueprints,

and lettering from the content of the course. Problems are taken from the furniture and the machine field.

10b. Elementary Architectural Drawing (chiefly for teachers)

Mr. Bollinger

Two credits: five hours a week, second semester.

117a and 117b. Special Methods and Teaching in Manual Arts

Mr. Bollinger

Four credits: two hours a week, first and second semesters.

The Industrial Arts Era

John Dewey's publication--The School and Society--marked a new era in the history of the industrial education movement. The book described the work Dewey and his colleagues were involved in at the Laboratory School of the University of Chicago. Their work emphasized the social meaning of education in an industrial society. The curriculum of the laboratory school was designed around industrial occupations.

One of the first individuals in the Manual Training/Manual Arts fields to be influenced by the work of John Dewey was Charles R. Richards, head of the Manual Training Department of Teachers College, Columbia University. Dr. Richards recommended in 1904 that the industrial education profession use the term "industrial arts" in place of "manual training". There were numerous other individuals that followed Dr. Richards recommendation to accept the term "industrial arts". They defined industrial arts as those occupations by which changes are made in the form of materials to increase their values for human usage. As a subject for educative purpose, industrial arts became known as a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to their changes. Throughout the twenties, as shopwork in the schools became increasingly common, the distinction between manual training, manual arts, and industrial arts became increasingly less sharp. The terms were used interchangeably, and other terms such as practical arts, industrial education, and industrial training were added as synonymous. However by 1933, Industrial Arts had been more distinctly defined as one of the practical arts, a form of general or non-vocational education, which provides learners with experiences, understanding, and appreciation of materials, tools, processes, products, and of the vocational conditions and requirements incident generally to the manufacturing and mechanical industries. It replaced the historical but narrower term "Manual Training" and the less significant term "Manual Arts". The new term--Industrial Arts--emphasizes the arts of industry rather than just manipulative or "manual aspects of artistic construction implied in the term "Manual Arts".

Professor E. W. Bollinger promoted the name change at the University of North Dakota from Manual Arts to Industrial Arts in 1926. The 1927-28 UND Catalog included the following mission statement and courses for the new program known as Industrial Arts:

Industrial Arts

E. W. Bollinger, Assistant Professor

Earl Rogers, Instructor

The courses in the department of Industrial Arts are arranged (a) to train supervisors and teachers of Industrial Education, and Manual Arts for the public schools, (b) to furnish information about the organization and existing practices in Industrial Education and Vocational Education and Industrial Arts to those students training to be principals and superintendents, and (c) to offer elective courses to general students in the College of Liberal Arts.

Students expecting to teach industrial arts should follow the sequence of courses as outlined under School of Education, curriculum for a major in industrial arts. Other students may choose industrial arts as their major or minor subject.

Courses In Industrial Arts

Woodworking	4 credits
Art Fibre Construction	4 credits
Advanced Woodworking	4 credits
Carpentry	2 credits
Problems & Processes In Industrial Arts	4 credits
Every-Day Mechanics	4 credits
Mechanical Drawing For Teachers and Pre-Dental Students	4 credits
Advanced Mechanical Drawing For Teachers	4 credits
Elementary Architectural Drawing	2 credits
Elementary Printing	4 credits
Organization & Supervision of Industrial Arts	2 credits
Industrial Education	3 credits
Special Methods & Teaching In Industrial Arts	4 credits

In addition, the following courses offered by the department of Mechanical Engineering and Ceramics were available on an elective basis by students majoring in Industrial Arts:

Mechanical Engineering Electives

Forging and Welding	1.5 credits
Pattern Making and Foundry	1.5 credits
Machine Shop	1.5 credits
Advanced Machine Shop	1.5 credits
Ceramics	4 credits
Ceramics--Building & Modeling	4 credits

Graduate courses in Industrial Arts were introduced in 1932. The graduate division courses were 509-510--Minor Problems In Industrial Arts (two to four credits). The courses were designed to allow students to select and work on some professional problems involved in the industrial arts. The course allowed for both conference and group activities and a one hour meeting was held each

week to allow opportunity for mutual exchange of ideas, criticisms, and suggestions for each individual or group activity. These two courses laid the foundation for the development of a graduate degree program that was initiated in 1956.

For years 1933 and 1934 the program for industrial arts became known as "Shops". It was a merger of the engineering shops and the industrial arts program. The UND catalogues for the two years included the following mission statement:

Shops

(Engineering Shops and Industrial Arts)

E. W. Bollinger, Assistant Professor
A. W. Preston, Assistant Professor

Courses in the department of Shops are arranged to serve three groups of students: (a) General Engineering Shop, for students in the School of Engineering; (b) Industrial Arts Education, for students in the School of Education majoring or minoring in Industrial Arts; (c) General Shop courses, offered as electives for students in the College of Liberal Arts.

Students expecting to teach Industrial Arts should follow the sequence of course as outlined under the School of Education curriculum for a major in Industrial Arts. Other students may choose Industrial Arts as their major or minor subjects.

By 1935, the engineering shops became part of Engineering. Industrial Arts regained its title as a sole department with a new mission statement. The following statement and curriculum was included in the 1935 catalog:

Industrial Arts

Elroy W. Bollinger, Associate Professor

Junior Division Courses

Courses in the Department of Industrial Arts are arranged to serve three purposes: (a) As a major or minor for undergraduate students in the School of Education and a minor for graduate students; (b) As elective for students in the College of Science, Literature and Arts and others; (c) As service courses for other departments such as art, home economics, pre-dentistry and journalism.

Curriculum For Major In Industrial Arts

Two minors are required. They may be selected from the following and appear in the order recommended: Mathematics, Natural Science, Physical Education, Social Science, Art, History. Substitution for other minors not recommended, may be made by special permission of the Dean of the School of Education.

Freshman Year		First Semester	Second Semester
Freshman Rhetoric (Engl. 101-102)		3	3
General Physics (Phys. 103-104)		4	4
Industrial Arts Laboratory (Ind. Arts. 101-102)		4	4
Drawing Laboratory (Ind. Arts. 107-108)		3	3
Physical Education (Phys. Ed. 101-102)		3/4	3/4
Military Science (Mil. Sci. 101-102)		1	1
Sophomore Year			
General Psychology (Psy. 201)		4	
Fundamentals of Speech (Pub. Sp. 101-102)		2	2
Principles of Economy (Econ. 201)		3	
Intro. to Sociology (Soc. 101)			3
General Chemistry (Chem. 103-104)		4	4
Industrial Arts Laboratory (Ind. Arts 201-202)		4	4
Physical Education (Phys. Ed. 201-202)		3/4	3/4
Military Science (Mil. Sci. 201-202)		1	1
Junior Year			
Educational Psychology (Psy. 203)		3	
General Methods of High School Teaching (Educ. 303)			2
Principles of Secondary Ed. (Educ. 305)		3	
Problems and Processes (Ind. Arts 301-302)		2	2
Printing Laboratory (Ind. Arts 210-211)		2	2
Design (Art 103-104)		2	2
Descriptive Geometry (Eng. Dr. 102)			2
Machine Shop (Eng. Shops 215)		2	
1 select subject toward minors		4	7

Senior Year

Philosophy of Education or History of Education (Educ. 301 or 455)	3	
Educational Tests & Measurements (Educ. 309)		4
Industrial Vocational Educ. (Ind. Arts 453)	3	
Organization and Administration of Industrial Arts (Ind. Arts 410)	2	
Special Methods and Teaching Industrial Arts (Ind. Arts 413-414)		6
1 select subject toward minors and electives .	9	8

A course entitled 308--Home Design was added to the industrial arts offerings in 1935. The course was primarily designed for students of Home Economics. The content included the planning of houses, involving floor plans, elevations and ground design through the actual drawing of plans.

In the Fall of 1935 Professor Bollinger had left the University and Professor Arthur W. Gill became the head of the department. Professor Gill had received a B.S. degree from the University of Colorado; M.A. degree from Colorado State College of Education. He had been an instructor at the University of North Dakota, 1930-31 and then taught in the high school at Chisholm, Minnesota from 1931-35 prior to returning to UND. He served as head of the Department of Industrial Arts from 1935-1942.

Two new courses were added to the existing curriculum during Mr. Gill's tenure as head of the department from 1935-42. These were a course in Bookbinding and a course in Art Metal.

Industrial Arts--(1942-1960)

The outbreak of World War II profoundly affected industrial arts education and every other aspect of American life. The scarcity of new tools, equipment, supplies, and materials hampered all industrial arts laboratory programs and necessitated an emphasis on repair and maintenance of existing equipment. It forced many programs to close during the war including the one at the University of North Dakota that was temporarily closed from 1942-46.

For the programs that did exist at other institutions during the early 1940's, the emphasis was on repair operations generally utilizing less materials than the fabrication of new products. Quite popular in the industrial arts courses were operations previously attributed chiefly to the home mechanics programs of the twenties and thirties. Perhaps the biggest effect on the industrial arts program in the early forties resulted from the shortages of teachers in the field. Because of the technical knowledge and ability possessed by the industrial arts teacher, he was in great demand to fill defense positions during the war years.

In 1946, with the Second World War now over, the Department of Industrial Arts at the University of North Dakota was reopened. The curriculum that had been established prior to the war was reestablished and offered during the 1946-47 academic year. A World War II single story wooden barrack building was moved on campus to house the department. The wooden structure was nestled inconspicuously behind the stately brick buildings of biology and education. It was declared that the barrack would serve as a temporary housing for the department until new quarters could be constructed. But as it turned out, the structure managed to provide facilities for all areas of industrial arts from 1946 to 1980. Through this experience, the word "temporary" has taken on a new meaning by the various faculty members during that time period.

Before the program was reopened in it's new quarters, Dr. Marvin F. Poyzer became the head of the department and remained as chairman from 1946-1960. He had received a B.S. degree from the University of North Dakota, an M.A. from Colorado State College of Education, and an Education Doctorate from Bradley University.

The faculty members that served the department of industrial arts during the time period 1946-1960 included:

<u>Faculty Members</u>	<u>Years Served</u>
Dr. Marvin F. Poyzer (Chairman)	1946-1960
Mr. Robert Woychick	1949-1951
Mr. Robert Bergstrom (Acting Chairman 1952)	1951-1956
Mr. Kenneth Barrett	1952-1953
Mr. Frank R. Steckel	1956-1962
Dr. Stanley Brooks	1957-1961
Mr. James E. Lahren	1958-1961

The time period between 1946-1960 was a period of growth and development in the Department of Industrial Arts education at the University. The number of undergraduate majors steadily increased from the time the department was reopened to sixty-five by 1960. The undergraduate curriculum was expanded to meet the needs of students. An article written by Dr. Marvin F. Poyzer published in the 1959 College of Education Record had the following purpose statement and curriculum for Industrial Arts.

Industrial Education At The University of North Dakota

Marvin F. Poyzer

Industrial education at the University of North Dakota is centered around the Department of Industrial Arts. The department offers courses leading to major work in industrial arts in the Colleges of Education, and Science, Literature and Arts. The major in the College of Science, Literature and Arts consists of thirty selected credits in industrial arts and is designed for students that do not wish to teach but do want a maximum of technical courses to help them in their future work. The major in the College of Education prepares students for instructing the industrial arts in junior and senior high schools of the state and nation. The various areas and courses for this preparation are given below.

The Industrial Arts Major

Drafting and Design Area

4 cr. 103-104	Design (Art)
6 cr. 107-108	Drafting
3 cr. 321	Adv. Drafting and Design
2 cr. 322	Instructional Materials in Ind. Arts.
2 cr. 120	Home Design (elective)

Metal Fabrication and Technology

3 cr. 101	Metal Fabrication and Technology
3 cr. 318	Machine Shop (Engineering)
2 cr.	Foundry and Welding (Engineering)
2 cr. 401	Adv. Metal Fabrication & Technology
2 cr. 217	Jewelry & Lapidary (Elective)

Wood Fabrication and Technology

3 cr. 102	Wood Fabrication & Technology
3 cr. 402	Adv. Wood Fabrication & Technology
2 cr.	Pattern Making (Engineering) (elective)

Mechanics

3 cr.	Mechanics Laboratory
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Graphic Arts

4 cr. 309-310	Printing and Graphic Arts
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Crafts

4 cr. 203-204	Craft Processes leather, metal, enameling, plastics
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Theory

2 cr. 410	Organization and Administration of Industrial Arts Programs
2 cr. 453	Industrial Arts and Vocational Education
3 cr. 466	Special Methods and Materials in Industrial Arts
4 cr. 476	Supervised Student Teaching (Education)

Total 41 selected credits.

Graduate Program Inaugurated: Since industrial arts was on the rise in our nations schools, there was a need to provide advance study for instructors and those administrators responsible for supervision of industrial arts education. Two new graduate programs in Industrial Education leading to a Master of Science or Master of Education were inaugurated by the department in 1956.

The programs were designed to give opportunities for creative enterprise as well as practical experiences in new areas and techniques. It was stated that the distinguishing feature of industrial arts instruction namely craftsmanship of high order in materials and knowledge of laboratory methods of instruction, demanded graduate work that was specialized and individualized.

The UND Graduate Bulletin of 1959-61 included the following industrial arts graduate programs and courses:

Industrial Arts

Associate Professor Marvin F. Poyzer

The degrees of Master of Science or Master of Education may be taken in the Department of Industrial Arts. A minimum of 20 semester credits of undergraduate industrial arts courses are required for acceptance to full graduate status in either degree program. Selected senior courses with additional assignment of work may be included in the graduate programs. Industrial Arts 536, 538 and 540 are recommended to principals and superintendents for assistance in administering and understanding industrial education.

509. Special problems in Industrial Education. One to four credits. Individual research or problem solving; areas to be determined by need, background, and interest.

510. Improvement of Instruction in Industrial Education. One to four credits. Individual or group work in area competence; special methods, techniques or processes; craftsmanship and competence sought in skills of instruction and transformation of materials.

536. Organization and Supervision of Industrial Arts in the Elementary and Secondary Schools. Two credits. Recommended for principles, superintendents, and future administrators. History and philosophy of industrial education and relationships with total school curriculum; administrative problems related to industrial arts.

538. Contemporary Trends and Issues in Industrial Education. Two credits. Understanding and searching inquiry into industrial education, vocational education, cultural education, and other facets of attitude and acceptance; the changing scene of educational philosophy and industrial arts education.

540. Planning and Equipping Industrial Arts Facilities. Two credits. Factors of school shop planning and equipment selection; architectural considerations.

542. Seminar in Industrial Arts. Two credits. Group discussion of common problems; semantic factors of industrial education; group exploration of topics related to industrial education or other duties of industrial arts instructors.

544. Advanced Industrial Arts Drafting and Design. Two credits. Advanced techniques of design and project selection; instructional techniques in drafting and design.

402. Advanced Wood Fabrication and Technology. Three credits.

412. Basic Electronics. Three credits.

480. Experimental Materials and Processes for Industrial Arts. Two credits.

Shop Planning Service: The Department of Industrial Arts inaugurated a "shop planning service" for school boards and administrators in 1956. The faculty provided this service to schools in the state and surrounding area to assist teachers and administrators in the design, layout and planning of industrial arts laboratories. The service included:

1. Survey of community factors.
2. Theory and organizational planning.
3. Suggested programs meeting the objectives of the State High School Industrial Arts Course of Study in terms of local conditions.
4. Plans and drawings that may be submitted to architects or school boards.
5. Check lists of shop planning factors such as lighting, utilities, and storage.
6. Models of different types of equipment and furnishing arrangements.
7. Discussion leaders for board of public meetings concerning adoption of industrial arts programs.

Superintendents and others interested in obtaining this information and guidance were urged to use the facilities of the "planning service" to aid them in planning industrial arts programs and facilities for their schools.

Professional Industrial Arts Fraternity: The first student craftsman group was founded in 1921 and became known as "Alpha Tau Fraternity". The 1949 Dacotah Annual stated:

Alpha Tau is a professional industrial arts fraternity at the University established for the purpose of maintaining high scholarship, brotherhood and professional interest for majors, minors and instructors in industrial arts.

Included among the organization's projects are the sponsorship of the Woodchoppers' Ball, held every fall; an open house held in the spring; and the making and selling of North Dakota souvenir articles. Re-activated last spring, after having been discontinued during the war, Alpha Tau is one of the most active groups on the campus. Their entry in the Homecoming Parade won third place.

Alpha Tau's officers are Selmer Aalgard, president; Neal Fox, vice president; Herbert Smith, secretary-treasurer. Faculty advisors are Robert Woychick and Marvin Poyzer.

The honorary professional fraternity was dedicated to serve individual members while at the same time functioned to enhance the overall professional standing of industrial education. The honorary fraternity strived to instill in each member such qualities as leadership, a high standard of ethics, organized thought and a high level of communication.

In the 1954 Dacotah Annual, it was mentioned that

"fraternity members received a lot of ribbing about the several classes in 'clay throwing' and 'basket weaving' but this was taken with good nature. These men use their hands as well as their heads (other than for hammers), and are not ashamed to exhibit the wood-work that they create".

The members met twice a month with the emphasis of each meeting placed on fabrication of products of industry through guest lectures, field trips, demonstrations, and numerous work projects designed to raise funds such as the annual toy repair project for the disadvantaged children. In addition, the fraternity members assisted the faculty in redesigning the industrial arts physical facility from time to time. For example, they put their craft to use in 1957-58, when they installed a "new look" in the white frame barrack. The 1958 Dacotah contained the following statement:

The group (Alpha Tau) exploited the "do it yourself" kick, as they completely redecorated their lounge along modern lines. Although new furniture and materials were purchased, all the work was done by the members of the fraternity.

Alpha Tau Fraternity had no problem identifying special projects to undertake. For example when Old Main was razed on campus, they scrounged the ruins, constructed mementos and capitalized on the event. Bookends, gavels and paperweights were fashioned by the "crafty" Alpha Tau members, and sold them at a premium to raise funds. In addition, the UND mace was constructed by Alpha Tau members from the Oak of the Old Main that is currently being carried by the grand marshal at the University of North Dakota commencements.

This group continues to be active in the department and on the UND campus. They engage in special projects, conduct field trips to industry, plan professional and social gatherings. Historically, they have been attending the American Industrial Arts Association International conferences. The fraternity's current objectives are to:

1. Promote professional relations within the Department of Industrial Technology.
2. Instill within each member a greater appreciation of the field of Industrial Technology and Industrial Arts.
3. Provide services to the Industrial Technology Department, the University of North Dakota, and the Industrial Arts programs in North Dakota Public Schools.

The Industrial Arts Facility: As was mentioned earlier, the department was housed in its own physical facility after the post World War II years. It was a frame structure that covered approximately 10,000 square feet of space. The design was a large general shop arrangement containing the woodworking and metalworking tools and machines, plastics, silversmithing, lapidary and welding equipment. A large separate drafting room lighted with fluorescent lights provided stations for some twenty students. The graphic arts room contained a large power platen press, a small hand press and other necessary equipment for printing and other graphic arts processes. An addition was added to the building during the 1950's for the areas of mechanics and electrical benches, tools and equipment. The area of electronics was introduced on a small scale that later became an important part of the industrial arts curriculum. In addition, a classroom, student study room, offices, storage rooms and display areas were added to the facility. The machine shop, foundry, forging and welding were taught as separate classes in the Engineering Shops until 1962.

Plans for a new Industrial Education Center had been drawn by the faculty during the fifties. The College of Education Record, 1959, stated that new facilities were being planned for the near future. However, new quarters did not become a reality and the operation budget limited progress. The Department's 1956-57 Annual Report indicated:

This department has for many years been running on a minimum amount of money. It has 'made do' with old equipment and machines. It has used scrap materials and reclaimed machinery. We requested some \$3500 last year for new equipment and supplies and received some half of this amount...

This department is rapidly approaching the stage where it will either be a major force in industrial education in this state or will be a second class instructional unit--because of its facilities and budget.

The department continued to struggle along with a limited budget and temporary physical facilities during the fifties. Due to these conditions and excellent opportunities for advancement in the profession elsewhere, faculty members left the University. Mr. Woychick had left in 1951; Mr. Bartett in 1953, Mr. Bergstrom accepted a drafting position at the General Motors Institute, Flint Michigan, in 1956, and Dr. Marvin Poyzer left in 1960. Dr. Poyzer had made a significant contribution to the department, University and the State of North Dakota while serving as chairman of the industrial arts department from 1946-60. His efforts laid the foundation for industrial arts at the University for the future. He resigned in the spring of 1960 to accept a similar position at the University of Hawaii where he is recently retired as chairman of the industrial education department.

Industrial Arts In The 1960's

Industrial arts education was an integral part in the reform movements in formal education in the sixties. With an initial impetus coming from Sputnik, the late 1950's and 1960's began a period of intense curriculum reform throughout the country. Through this industrial arts witnessed many new and innovative curriculum movements. A National Conference report entitled, Improving Industrial Arts Teaching, was published in 1960 to consider the significant problems affecting industrial arts education. The publication set forth the following four objectives which became the foundation for industrial arts curriculum development:

1. To develop in each student an insight and understanding of industry and its place in our culture.
2. To discover and develop talents in students in the technical fields and applied sciences.
3. To develop technical problem-solving skills related to materials and processes.
4. To develop in each student a measure of skill in the use of the common tools and machines.

In the field of industrial arts teacher education, The Minnesota Plan for Industrial Arts Teacher Education, published in 1958 played an important role in the revision of teacher education programs throughout the country. The proposed teacher education program was the result of a two-year study designed to prepare teachers for industrial arts program reflecting a society dominated by technology.

As individuals and groups of industrial arts educators undertook to make revisions in existing programs, four major directions were pursued: (1) Industry as a source of content had been the acceptable model for decades; it seemed logical to extrapolate from the past and move to update existing industry-centered programs. (2) As an expanded structure was sought to include the industrial sphere, technology became a logical base; technology could be ordered into a taxonomic matrix and studied as a discipline. (3) The individual assumed a high level of priority during the 1960's; as education focused upon individualized instruction and upon the importance of individual development for social progress, the individual became a logical focal point for efforts in industrial arts program revision. (4) Perhaps the most obvious approach in curriculum improvement was to build directly upon existing programs, modifying them to meet the needs of the times. During the 1960 decade, the redirection approach took recognizable shape in funded projects.

Developments in Industrial Arts at UND: The 1960's was a decade of flux and change with new faculty, increased enrollments and additional instruction space. The faculty directed their efforts toward reorganization and strengthening the curriculum and course content for each of the instructional areas. With the resignation of Dr. Marvin Poyzer in the Spring of 1960, Mr. Frank Steckel was appointed as Chairman of the Industrial Arts Department.

Mr. Steckel had been on the faculty in the department since 1956 prior to becoming chairman. He had received a B.S. degree and M.S. degree from the University of North Dakota. Other faculty members that served during the 1960's were:

Faculty Members	Years Served
Mr. Frank Steckel	1956-1962
Dr. Stanley Brooks	1957-1961
Mr. James E. Lahren	1958-1961
Dr. Alvin Rudisill	1960-1971**
Dr. Luvern R. Eickhoff	1961-Present
Dr. Herbert J. Auer	1962-Present*
Dr. Robert Albert	1961-1963
Dr. Myron Bender	1963-Present***
Dr. Maurice Vaughan	1967-1969

*Herbert J. Auer was on leave from 1966-68 to do graduate work toward a doctorate degree at Arizona State University.

**Alvin E. Rudisill was on leave during 1968-69 and completed a doctorate degree at the University of Northern Colorado.

***Myron Bender served as Acting Chairman of the Industrial Arts Department for the 1968-69 school year and was on leave during 1970-72 to do graduate work toward a doctorate degree at the University of West Virginia.

During the early sixties, there were a number of changes in the industrial arts faculty. In 1961, Mr. Lahren resigned to accept a similar position at Brockport College in New York. In addition to teaching industrial arts courses, Mr. Lahren developed a Manual Therapy program in the department. The program was affiliated with Fort Meade and Minneapolis Veterans Hospitals. Also in 1961, Dr. Brooks resigned and accepted a position at New York Teachers College, Buffalo, New York as supervisor of student teaching in the Department of Industrial Arts. Mr. Frank Steckel resigned in 1962 as chairman of the department and accepted the chairmanship of the Industrial Education Department at Appalachian State University, Boone, North Carolina. Dr. Alvin E. Rudisill became the new department chairman at UND in 1962.

Program Developments in the 1960's: Beginning with the 1960's, it was a period of consolidation and improvement for the Department of Industrial Arts. Faculty efforts were directed toward the reorganization and strengthening of course content, total curriculum improvement through revisions and continued improvements in the physical facility that housed the department. There was a continued growth in industrial arts major enrollment. In addition to the industrial arts major enrollment, the growth of service courses for elementary teachers and occupational therapy majors substantially increased during this period.

The Department of Industrial Arts at the University of North Dakota became the only four year industrial arts teacher preparatory program and graduate program in the State of North Dakota. Ellendale State College became a branch of the University in 1967. The UND Ellendale Branch became a two-year program in industrial arts which was later increased to three. A number of students, upon completion of the industrial arts program at Ellendale, transferred to the industrial arts program at the University campus to complete a degree.

Two new programs were introduced during the sixties--Industrial Technology and Driver and Traffic Safety. The Industrial Technology degree program was established in the College of Arts and Science for those students interested in seeking positions in industry or the operation of small manufacturing, farming or construction industries. A minor program in Driver and Traffic Safety was established through the College of Education for the preparation of "driver education" teachers for secondary schools.

The new programs and the additional students that transferred from the two-year UND Ellendale Branch, along with the constant increase in the established industrial arts teacher preparatory program, caused the department enrollment and number of majors to more than double during the 1960 decade.

Introduction of a Diversified Curriculum: The industrial arts curriculum went through an evolving process at the University of North Dakota during the sixties. The faculty studied national trends and continually modified the curriculum through the reconstruction of course offerings in light of significant changes brought about by the various industries and their technologies. Numerous new courses were added to allow for greater specialization for students seeking positions in industrial arts teaching and those interested in preparing themselves for business/industry related positions.

From 1962-1966, the industrial arts faculty studied curriculum needs for a changing society. This effort culminated in a new curriculum designed to better meet the needs of industrial arts teachers with a greater degree of specialization for those seeking positions in industry. The new program incorporated courses from other departments on campus and become more diversified with specialization in a number of technical arts with options that students could choose for preparation in teaching or industry. The specific mission statement and curriculum listed in the 1966-68 University Undergraduate catalog was as follows:

Industrial Arts 1966-68

The Department of Industrial Arts has three major functions: first, to offer courses for a major or minor in Industrial Arts leading to the Bachelor of Science in Education degree for those students wishing to become accredited instructors of the industrial arts in junior and senior high schools and colleges; second, to offer courses leading to a major or minor in the Bachelor of Arts or Bachelor of Philosophy degrees in the College of Science, Literature and Arts for those students interested in industry or the operation of small manufacturing, farming or construction business; third, to offer courses in the crafts, wood processes, metal processes, etc. for those students wishing creative and constructive experiences in the transforming of materials. These courses are often taken as electives or minors to strengthen major work in art, home economics, physical education, occupational therapy, business education, elementary education, etc.

Suggested Curricula For The Major and Minor in Industrial Arts

Recommendationed Minors: Art, Mathematics, Technical Drawing
General Requirements
for
Curricula I, II and III

	Semester Hours
Orientation to the Industrial Arts (I.A. 100)	2
Engineering Graphics (E. Dir. 101)	2
Metal Fabrication and Technology (I.A. 101)	3
Wood Fabrication and Technology (I.A. 102)	3
Power Mechanics (I.A. 201)	3
Fundamentals of Electricity (I.A. 202)	3
Graphic Arts (I.A. 209)	3
Advanced Drafting and Design (I.A. 321)	3
Organization and Administration of Industrial Arts (I.A. 410)	2
Shop Planning and Maintenance (I.A. 444)	2
Total	26

Requisites in other departments:

Introductory College Physics (101-102)	8
First Aid (HPER 305)	2
Total	10

Curriculum I
Industrial Arts: Comprehensive

General Requirements as listed above	26
Graphic Arts - Printing Processes (I.A. 309)	3
Advanced Metal Fabrication and Technology (I.A. 401)	3
Advanced Wood Fabrication and Technology (I.A. 402)	3
Advanced Power Mechanics (I.A. 403)	3
Industrial Plastics (I.A. 408)	3
Basic Electronics (I.A. 412)	3
Total	<u>44</u>

Curriculum II
Industrial Arts: Specialized Areas

General Requirements as listed above	26
(Complete requirements in any 3 areas)	
Drafting:	
Descriptive Geometry (E. Dr. 102)	2
Production Drawing (E. Dr. 320B)	2
Architectural Drawing (E. Dr. 320A)	2
Graphic Arts:	
Graphic Arts - Printing Processes . . (I.A. 309)	3
Printing and Publishing (Jour. 314)	3
Electricity-Electronics:	
Basic Electronics (I.A. 412)	3
Advanced Electronics (I.A. 422)	3
Metal Fabrication and Technology:	
Manufacturing Processes II-	
Machine Tools (M.E. 218)	2
Advanced Metal Fabrication and Technology (I.A. 401)	3
Wood Fabrication and Technology:	
Advanced Wood Fabrication and Technology (I.A. 402)	3
Industrial Plastics (I.A. 408)	3
Power Mechanics:	
Driver Education (I.A. 225)	3
Advanced Power Mechanics (I.A. 403)	3
Total	<u>43-44</u>

Curriculum III
Industrial Arts: Specialized Areas

General Requirements as listed above	26
(Complete requirements in any one option)	
Option I - Drafting	
Lettering (Art 120)	2
Descriptive Geometry (E. Dr. 102)	2
Topographical Drawing (E. Dr. 210A)	2
Pictorial Drawing (E. Dr. 210B)	2

Architectural Drawing	(E. Dr. 320A)	2
Production Drawing	(E. Dr. 320B)	2
Cartography	(Geog. 421)	2
Illustration	(Art 200)	2
Total		<u>42</u>

Requisites in other departments:

College Algebra	(Math 103)	3
Trigonometry	(Math 105)	2

Option II - Graphic Arts

Reporting	(Jour. 201)	3
Elementary News Photography	(Jour. 203)	2
Advising High School Publications	(Jour. 310)	2
Graphic Arts-Printing Processes	(I.A. 309)	3
Printing and Publishing	(Jour. 314)	3
Publicity	(Jour. 206)	2
Total		<u>41</u>

Option III - Electricity-Electronics

Electronic Circuit Analysis	(E.E. 304)	3
Basic Electronics	(I.A. 412)	3
Advanced Electronics	(I.A. 422)	3

Requisites in other departments:

College Algebra	(Math 103)	3
Trigonometry	(Math 105)	2
Analytic Geometry and Calculus	(Math 211-212-213)	12

Option IV - Metal Fabrication and Technology

Manufacturing Processes I	(M.E. 211)	2
Manufacturing Processes II	(M.E. 218)	2
Physical Metallurgy	(M.E. 413)	3
Advanced Metal Fabrication and Technology	(I.A. 401)	3
Total		<u>36</u>

Requisites in other departments:

College Algebra	(Math 103)	3
Trigonometry	(Math 105)	2

Minor in Industrial Arts

Engineering Graphics	(E. Dr. 101)	2
Metal Fabrication and Technology	(I.A. 101)	3
Wood Fabrication and Technology	(I.A. 102)	3
Power Mechanics	(I.A. 201)	3
Fundamentals of Electricity	(I.A. 202)	3
Graphic Arts	(I.A. 209)	3

Advanced Drafting and Design (I.A. 321)	3
Organization and Administration of Industrial Arts (I.A. 410)	2
Total	22

Requisites in other departments:

Methods and Materials in Industrial Arts (Ed. 466)	3
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Department and Program Name Change: The industrial arts faculty conducted a study on the terminology used in the United States by similar programs in 1967. The study surveyed over two hundred institutions of higher education that offered industrial arts education programs. It revealed that the most common titles used by departments and programs were: (1) industrial arts education, (2) industrial education, (3) industrial education and technology, (4) industrial technology and (5) industrial technical education. The conclusion of the study was that only twenty-seven percent of the departments surveyed on a national basis retained the title of industrial arts. As the programs became more technical in nature, the course offerings became more diversified and many institutions changed their name from industrial arts to industrial technology. The term industrial technology was more descriptive of the programs being offered for students pursuing an industrial teaching degree as well as for those seeking positions as technologists in business/industries.

By 1967, approximately sixty percent of the UND industrial arts graduates were being employed as secondary school industrial arts teachers while the remaining forty percent accepted positions as technical instructors, instructors in industrial training and technologist for industry. To be consistent with national trends and to have the department and program descriptive of actual practice, the department and program name at the University was changed from industrial arts to industrial technology in 1969.

Numerous changes were made in the curriculum to reflect the new name. Clusters were formed with new specializations for the teaching and technologist programs:

Diversified Curriculum With Specialization

Prior to 1966 Specializations	New Curriculum With Options
(A) Comprehensive (Small Schools)	(A) Comprehensive
(B) Specialized (Mid-sized Schools)	(B) Specialized Curr. I
(C) Specialization Areas	(C) Specialized with options II
(1) Drafting	(1) Production Planning & Design Technology
(2) Graphic Arts	(2) Graphic Communications
(3) Electricity/Electronics	(3) Electronic Technology
(4) Metal Fab. & Technology	(4) Metal Technology
(5) Wood Fab. & Technology	(5) Wood/Plastic Technology

Three types of curriculums were designed to meet the varied needs of students: (1) A comprehensive curriculum for those students preparing to teach industrial arts in a junior high school or small (one teacher program) senior high school;

(2) A specialized areas curriculum for students preparing to teach in a school system having two or three industrial arts teachers; and (3) A specialized technical area curriculum for students planning to teach in a large high school. The latter two options also made it possible for students to concentrate primarily in one or more technical areas for preparation to work in industry.

Most of the changes that were brought about during the 1960's were in the form of restructuring rather than the addition of new courses. The new courses that were added included: (1) A third course in electrical technology; (2) An introductory course in plastics and (3) A course in Materials Testing & Analysis.

In addition to the technical options available through the industrial technology department, students could select courses in the departments of Journalism, Mechanical and Electrical Engineering, and supported by science and mathematics courses.

Industrial Arts NDEA Institutes: In 1966 the Higher Education Commission of the United States Senate approved an Amendment to the Higher Education Act of 1966 to include industrial arts as one of the critical areas in secondary education under Title III of the National Defence Education Act. The inclusion of industrial arts in the Title meant that industrial arts as a subject was included in all general federal legislation and was a peer legislatively with sciences, mathematics, english and modern foreign languages.

The University of North Dakota Department of Industrial Arts received national recognition and was selected to conduct three NDEA Institutes. In 1966 the department was one of five selected on a national basis to offer an institute for up-grading secondary school industrial arts instructors. It qualified again in 1967 and 1968. These were eight-week summer institutes. The primary purpose of the UND Institutes was to provide organization and administrative skills which enabled participants to plan and conduct small school industrial arts programs that would reflect contemporary content, purposes and teaching methods of industrial arts education. Dr. Alvin E. Rudisill served as the director of all three NDEA Industrial Arts Institutes. The institutes were extremely effective in up-grading the quality of the teaching/learning process in secondary school. Unfortunately, the NDEA Institutes were discontinued nationally after 1968.

Changes in the Physical Facility: Because of the expansion of the Ireland Cancer Research laboratory in 1962, the Industrial Arts Building was forced to make several changes in its temporary physical setup. An area approximately seven by fifty feet was removed from the northwest corner of the building to make way for the growing Ireland Research Laboratory. This reduced the already crowded industrial arts instructional space.

To compensate for the lost space, a temporary area of approximately 1,600 square feet was added to the southeast corner of the building. The new area was occupied by the metals program. The area that had been used by the metals program became a combination for an expanded electronics program and classroom. After the Geology Department moved to its new quarters in Leonard Hall, the electronics program was moved into the Northwest corner of the Old Geology building and the space that had been utilized by the electronics program became a mediated classroom.

The new addition for a metals area and other renovations was part of a \$10,000 improvement program project that was needed to meet the demands of an increasing enrollment. Faculty members assisted the contractor with the project during the summer of 1962. They forfeited their vacations in August and spent time in painting, constructing cabinets, and tool panels for the new addition. By the fall semester 1962-63, the wooden structure provided facilities for all areas of industrial arts--graphic arts and drawing, electricity/electronics, power mechanics, general woods and general metals. (See the 1962 proposed laboratory layout plans in Appendix A).

Numerous other changes were made to the physical facility during the 1960's to better serve student's needs and increased enrollments. The old white barrack that housed the department had many limitations but served the program fairly well for many years considering it was a temporary facility. Since it was a frame structure, the facility was easily adapted to meet the ever-changing nature of the program. Sometimes it seemed that the only thing that kept the structure erect was the plumbing and wiring utilities that were constantly modified and added to connect the instructional equipment and other furnishings as the program needs expanding. (See Floor Plan as it existed by 1970 in Appendix "B").

Time Period--1970 to the Present

The 1970's and early eighties welcomed a number of changes to the Department of Industrial Technology. With the name change for the department and program during the latter sixties came a need to change the instructional content to be conducive with the dual functional program. The industrial arts teacher education components enrollment stabilized during the 1970's while the industrial technologists program component continued to grow with increasing enrollments. The faculty devoted considerable time to the restructuring of content to maximize resource utilization (faculty, number of courses, facilities, etc.) to meet the needs for the changing nature of the departmental mission.

March 1972, the North Dakota State Board of Higher Education approved the College For Human Resources Development. The Department of Industrial Technology withdrew from the College of Education which was being merged with the New School of Behavioral Studies in Education to form the Center for Teaching and Learning. The declared purpose of the College of HRD was to prepare students for careers in human services professions. With the new college affiliation, the Industrial Technology Department dropped the major formerly offered through the College of Arts and Sciences. It did retain the teacher certification component with the Center for Teaching and Learning for the students preparing to become public school teachers.

Faculty: The faculty turnover rate stabilized during the 1970's as compared with the previous decade. With the closing of UND Ellendale Branch, Mr. James S. Stinson, who had been chairman of the Industrial Arts Department at the Ellendale Branch, joined the UND faculty in 1970. Dr. Alvin E. Rudisill who had been with the University since 1960 resigned in 1971 and accepted a position as Head of the Industrial Technology Department at the University of Northern Iowa. There he served from 1971-79, when he resigned to accept the Deanship of the College of Technology at Eastern Michigan State University where he is presently serving. Dr. Rudisill was elected President of the American Industrial Arts Association for the year 1977-78.

Dr. Wayne Zook from Illinois State University took over the Chairmanship of the department and served from 1971-73. Upon the resignation of Dr. Zook to accept a teaching position in the Construction Technology program Illinois State University, Dr. Myron Bender was named Chairman of the Industrial Technology Department. The total faculty that served during the 1970's and early eighties were:

<u>Name</u>	<u>Years Served</u>
Dr. Alvin E. Rudisill (Professor and Chairman) B.S., Moorhead State University; M.S., University of North Dakota; and Ed.D., University of Northern Colorado.	1960-71
Dr. Luvern R. Eickhoff (Associate Professor) B.S., Bemidji State University; M.Ed. University of North Dakota; Ph.D., Iowa State University.	1961-present
Dr. Herbert J. Auer (Professor) B.S. and M.Ed., University of North Dakota; Ed.D. University of Northern Arizona.	1962-present
Dr. Myron Bender (Professor and Chairman) B.S., Ellendale State College; M.Ed., Colorado State University; D.Ed., West Virginia University.	1963-present
Mr. James S. Stinson (Associate Professor) B.A., Jamestown College; M.S., University of North Dakota.	1970-76
Dr. Wayne Zook (Associate Professor and Chairman) R.A., Colorado State College; M.S., Ball State University; and Ph.D., Iowa State University.	1971-73
Mr. Gene Schlomer, (Instructor) B.S., Illinois State University; M.S., University of North Dakota.	1973-74
Dr. Raymond Podell (Assistant Professor) B.S. and M.S., Indiana State University; D.Ed. North Carolina State University.	1973-79
Mr. Gary Larsen (Instructor) B.S. and M.S., University of North Dakota.	1976-77
Dr. Wan-Lee Cheng (Associate Professor) B. Engr., Chung Yuan University--Republic of China; M.Ed., Sul Ross State University; Ph.D., Iowa State University.	1977-present
Dr. John W. Sinn (Assistant Professor) B.S. and M.S., Indiana State University; D.Ed., University of West Virginia.	1979-present
Mr. Keith Stenehem (Instructor) B.S. and M.S., University of North Dakota.	1979-present

Curriculum Re-direction: The basic structure of the existing undergraduate curriculum consisted of courses in the traditional industrial arts technical areas. These were (1) drafting, (2) graphic arts, (3) wood, (4) metal, (5) power, and (6) electricity/electronics. Due to the ever-quicken pace of technological change in society, it became evident that the traditional add-on approach to up-date the curriculum and course content became more difficult with an industry-based program. Some of the weaknesses of the traditional structure were:

- 1) As new courses and/or new electives were added to keep pace with technological change, it became increasingly difficult for students to "specialize" in a specific technical area while still obtaining the essential foundations in the other technical areas.
- 2) Because many technological concepts had relevance to more than one traditional technical-area division, duplicatory teaching coverage of such concepts was inevitably inherent in the curriculum structure.
- 3) The divisional aspects of the traditional technical-area pattern of course content breakdown poorly represented the structure, interdependency of technical content areas, and/or activities of any one industry or group of industries.

During 1973-74, the industrial technology faculty agreed that a major curriculum revision was necessary with a new knowledge structure adaptable to change. A research project was initiated to determine the nature of a new curriculum structure that would meet the needs of both the teacher education and the technologist components of the existing program. Students and alumni were surveyed to identify unique and desirable characteristics of the then existing program. A study was conducted to determine national trends in industrial arts/technology curriculum structures designed to prepare both industrial arts teachers and technologists for industry. It was concluded that a curriculum structure that would serve a dual-purpose (teacher education and industrial technologists) was the best approach at the University of North Dakota because of the size of the department and number of faculty members.

The curriculum restructuring process was a three year project with input from students, graduates, faculty and consultants. The results of the project led to a curriculum structure that reflected the interrelationship and interdependencies of the various technical content areas related to the body of knowledge for the disciplines of industrial technology. The basic structure derived was centered around four technical areas: (1) Graphic Communication Technology; (2) Energy/Power Technology; (3) Production Technology (Manufacturing and Construction); and (4) Material Science Technology. These technical areas were designed to serve a dual-purpose program and were supported by a cluster of professional courses.

The curriculum restructuring project involved the dropping of nineteen courses; changing titles, descriptions and/or credit for twelve additional courses; and the adding of twenty-six new courses. In addition, three new technical minors, one for each of the three major technical areas, were added for students from other departments on campus who desire electing a technical minor as a supporting field of study.

The description of the four major technical synoptic areas as identified within the restructured program are:

Graphic Communication Technology

Graphic communications technology consists of: (1) technical graphics, (2) graphic arts/printing, (3) photography, and (4) visual presentations. Through courses such as technical illustration, design/drafting, reprographics, photoreprographics, electronic drafting, computer-aided phototypesetting, color theory and process, technical experimentation, etc. (supplemented by background coursework in visual arts, journalism, management, chemistry, and physics) students will be prepared for careers in management at various levels in the graphic business and industry, in selling, in supervision, in design, and in research, among others.

Energy/Power Technology

Studies concerning energy and power include energy sources and conservation, conversion/transmission devices and methods, power control techniques, data handling toward information and process control, and alternate energy sources utilization in relation to residential/domestic, industrial, and transportation applications. Students become involved in problem solving through laboratory experimental activities which promote understanding of both the traditional and the new energy and power systems.

Production Technology

Production technology includes studies in manufacturing and construction consisting of: (1) materials, (2) production processes, and (3) designing, planning, organizing, and fabricating materials and products. With these studies the student may wish to supplement one's background in computer science, mathematics, economics, marketing, management, sciences, statistics, or other subjects that may prepare them for careers at various levels in the production industries.

Materials Science

Studies in materials science involve scientific and logical analysis of industrial materials toward gaining the information needed for making decisions about materials usage in industrial applications. Students' coursework and laboratory experiences involve identification standards, composition and characteristics analysis, processing techniques, testing procedures, instrumentation for process and quality control, and other practices used by industry to maintain consistent quality of output.

The restructured program was implemented in the Fall semester of 1976. This new curriculum was unique in that it possessed an external structure with internal flexibility and adaptive to change. The specific mission statements and courses of the Department of Industrial Technology's restructured curriculum listed in the 1982-84 University Undergraduate Bulletin is as follows:

Industrial Technology (IT)

M. Bender (Chair), Auer, Cheng, Eickhoff, Sinn and Stenehjem

The Department of Industrial Technology offers an educational program designed to serve a variety of student interests related to technological literacy, industrial employment, and the preparation of industrial arts and technical education teachers for the secondary and post-secondary levels. The specific functions of the Industrial Technology program include:

- (1) To provide courses leading toward a Bachelor of Science in Industrial Technology through the College for Human Resources Development for students interested in seeking technologist supervisory or leadership position in industry or business related enterprises;
- (2) To provide courses leading toward a Bachelor of Science through the College for Human Resources Development or Center for Teaching and Learning with a major or minor in Industrial Technology Education for teaching industrial arts or technical education at secondary and higher education levels;
- (3) To offer interdisciplinary courses designed to contribute toward the fulfillment of the general University requirements and to provide courses and special programs to supplement other fields;
- (4) To provide courses leading toward technologist minor in the areas of Energy/Power Technology, Production Technology, and Graphic Communications Technology for any student on campus desiring a technologist supporting area;
- (5) To provide graduate courses leading toward Master of Science and Master of Education degrees with Industrial Technology as the major field of concentration supported by related cognate areas.

College for Human Resources Development

B.S. in Industrial Technology

Required 125 hours, including:

- I. General Graduation Requirements
- II. College for Human Resources Development Requirements
- III. The Following Curriculum:

Industrial Technology Core

IT 101	Intro to Energy/Power	(1)
IT 102	Intro to Graphic Communication	(1)
IT 103	Intro to Production Technology	(1)
IT 104	Characteristic of Materials	(3)
IT 201	Electromechanical Fundamentals	(3)
IT 202	Technical Illustration Techniques	(3)
IT 203	Production Processes	(3)
IT 211	Reactive Electrical Circuits	(3)
IT 212	Reprographics	(3)
IT 213	Construction Processes	(3)
IT 300	Technology, Society and the Individual	(2)

Electives (For teacher education program - 14 hours):
(For technologist program - 22 hours) selected from:

IT 301	Power Control Elements	(3)
IT 302	Photo Reprographics	(3)
IT 303	Integrated Production Techniques	(3)
IT 304	Materials Standardization	(2)
IT 311	Conversion and Transmission Systems	(3)
IT 312	Design/Drafting	(3)
IT 313	Construction Materials	(2)
IT 314	Instrument Calibration and Maintenance	(2)
IT 316	Industrial Arts in Elem. School Curriculum	(2)
(For teaching degree program only)		
IT 323	Applied Synthetics	(3)
IT 401	Electronic Communication Systems	(1-2)
IT 403	Prototype Production	(1-4)
IT 404	Materials Testing	(3)
IT 411	Transportation Technology	(2)
IT 412	Electronic Drafting	(2)
IT 413	Construction with Modular Components	(2)
IT 421	Logic Circuits	(2)
IT 422	Construction Drafting	(2)
IT 485	Field Exp. in Industrial Tech	(1-6)
IT 497	Directed Studies in Industrial Tech	(2-8)
IT 498	Technical Experimentation	(2-4)

Supplemental courses from other departments:

Phys 101	Intro to College Physics	(4)
Math 103	College Algebra	(3)

4 hours from:

Phys 102	Intro College Physics	(4)
Chem 105	General Chemistry	(4)

2 hours from:

Math 105	Trigonometry	(2)
CSci 101	Intro to Computers	(2)
CSci 201	Fundamentals of Comp. Programming	(2)

Teacher Certification:

Students enrolled in the College for Human Resources Development who desire teacher certification must meet teacher certification requirements established by the Center for Teaching and Learning. The following Industrial Technology courses are required:

IT 401	Teaching Industrial Education	(3)
IT 410	Org. and Adm. of Industrial Education	(2)
IT 420	Designing Ind. Ed. Facilities	(2)

Industrial Technology Minors:

1. Minor in Energy/Power Technology
14 hours from course numbers ending in 1.
6 hours from course numbers ending in 2, 3, or 4 and IT 485, 497, & 498.
2. Minor in Graphic Communications Technology
14 hours from course numbers ending in 2.
6 hours from course numbers ending in 1, 3 or 4 and IT 485, 497 & 498.
3. Minor in Production Technology
14 hours from course numbers ending in 3.
6 hours from course numbers ending in 1, 2, or 4 and IT 485, 497 & 498.

In addition to the above industrial technology program, courses were added and taught by the I.T. faculty in metric conversion, photography, and alternate/solar energy sources. These courses are interdisciplinary and are offered through the College for Human Resource Development and the Department of Library Science and Audio Visual. A "Recreation Crafts" course is being offered as a service course for recreation majors in the Department of Health, Physical Education and Recreation.

The graduate program in the department was revised in 1978 to be consistent with the restructured undergraduate curriculum. In addition to the changing of course content, titles and descriptions, new courses were added; including:

591. Technical Problems: Energy/Power Technology
One to three credits
Individual and/or group study and laboratory of field analysis of contemporary problems and issues related to energy and power technology. One credit per problem. Course may be repeated to a total of 3 credits.
592. Technical Problems: Graphic Communications Technology
One to three credits
Individual and/or group in graphic communications technology. Analytical research and/or laboratory experimentation of contemporary problems and issues in advanced graphic science and technology. One credit per problem. Course may be repeated for a total of 3 credits.

593. Technical Problems: Production Technology One to three credits
Analysis of problems and issues in production technology conducted by the individual student and/or group, emphasizing a research/laboratory approach. One credit per problem. Course may be repeated to a total of 3 credits.
594. Technical Problems: Material Technology One to three credits
Study and laboratory analysis of contemporary problems regarding the composition, experimental testing, and/or potential applications of industrial materials. One credit per problem. Course may be repeated to a total of 3 credits.

The Reality of a New Physical Facility: The Old World War II barrack (temporary physical facility) housed the Department of Industrial Technology from 1946 to 1980. Annual requests by the I.T. faculty and two affiliated colleges went unfulfilled for thirty-four years. Finally, an office-laboratory building for biological science and industrial technology was authorized for the University of North Dakota by the 1977 session of the North Dakota Legislature. Groundbreaking for the structure, named Starcher Hall in honor of UND President Emeritus George W. Starcher, took place on May 22, 1979, and construction was completed by December of 1980. The total building cost exceeded \$3.79 million.

Starcher Hall contains 83,514 square feet of space, with approximately two-thirds of it assigned to the Department of Biology and one-third to the Department of Industrial Technology. The building has a common foyer that divides the biology portion (north wing) from the industrial technology portion (south wing).

Three-fourths of the industrial technology space is on the ground floor consisting of offices, resource center, seminar room, mediated classroom, an energy/power laboratory, a material science laboratory, a production laboratory and a service laboratory. The graphic communications and photographic laboratories are on the second floor.

The physical facility was designed by the faculty on a conceptual approach with large open space laboratories adaptable to the newly restructured curriculum with numerous innovative features. The general layout of the new physical facility is included in Appendix C.

Student Organizations: The Alpha Tau professional fraternity continued as an effective student organization sponsoring numerous social and professional activities throughout each academic year. Its four basic purposes are: (1) to provide administrative coordination between the university, student government agencies, and student activities of the Industrial Technology Department; (2) to instill within each member a greater appreciation of the field of Industrial Technology; (3) to promote professional relations within the Department of Industrial Technology; and (4) to promote relations between the Department of Industrial Technology and individual industries. In the fall of 1979, a Student Advisory Council (SAC) was initiated in the Industrial Technology Department to act as a liaison between the students and the faculty in solving problems. The Council's primary goal is to stimulate and improve student-teacher relations. In doing so, it is hoped that the students will achieve their maximum academic potential.

SAC also conducts activities which allow the students to work with the faculty outside the classroom. Some of these activities involved the move to Starcher Hall. The establishment of a Departmental Newsletter and sponsoring a LOGO contest. These activities give the students an opportunity to become more involved with Industrial Technology, its responsibilities and its professionalism.

An application was made to the Board of Directors of Epsilon Pi Tau--International Honorary Fraternity for Education in Technology--for a UND chapter. The application was approved and the Gamma Gamma Chapter of EPT was awarded to the University of North Dakota with a formal chapter installation held on April 25, 1981. Epsilon Pi Tau is an honorary professional fraternity committed to recognizing academic excellence in research, practice in the profession of technology education and technical competence.

The Gamma Gamma Chapter of EPT Charter members were:

Alan O. Aas	Robert A. Hellem
Roger L. Anderson	Curtis D. Hoekstra
Herbert J. Auer	Diane L. Kvande
Gregory F. Belanus	Philip A. Mitzel
Donavan B. Bender	Paul J. Muckenhirn
Charles M. Bohn	Eddie G. Poehls
Ernest G. Breznay	William W. Quaday
Gregory W. Carnehl	Patrick A. Remfert
Luvern R. Eickhoff	Keith A. Stenehjem
Maureen G. Endres	Paul R. Franzmeier
John W. Sinn, Trustee	Wan-Lee Cheng, Co-Trustee
Myron Bender, Chairman	

The three student organizations joined the departmental faculty in 1981 and 1982 to plan and conduct the first two Annual UND Technology Education Conferences.

Service To The State: The faculty in the Department of Industrial Technology have consistently provided leadership to the State of North Dakota to aid in the advancement of industrial arts education in secondary schools. This has been in the form of consultant services, research projects, presentations at state conferences, leadership for the North Dakota Industrial Arts Association, and inservice teacher education through offering courses, workshops and conferences.

A good working relationships was maintained with the State Department of Public Instruction and the State Board for Vocational Education during the 1970's and is continuing. In 1974, Mr. Ernest Breznay, a graduate of the UND Industrial Technology Department, was appointed the first North Dakota Industrial Arts State Supervisor. Mr. Breznay became a key person for the coordination of state-wide activities to improve industrial arts in public secondary schools.

The UND Industrial Department conducted a number of research projects funded through the State Board for Vocational Education to improve the secondary school industrial arts instructional programs. During 1976-81, a master plan was developed and curriculums were developed on a two level basis. Level I was for the junior high school programs consisting of courses in (1) Insights

into Industry and Technology; (2) Graphic Communications; (3) Manufacturing; (4) Construction; and (5) Energy/Power. Instructional materials were developed and field tested. The Level I curriculum was implemented in 1977.

A second major curriculum project was conducted from 1979-81 for the senior high schools. This project identified twelve different courses for grades ten, eleven and twelve. The Level II Senior High Curriculum included four courses for each of three technical areas: (1) Energy/Power, (2) Graphic Communications and (3) Production. Individual course guides were developed for each of the twelve courses.

The department has conducted numerous inservice education programs throughout the State of North Dakota. Many seminars and workshops provided information concerning the new secondary school curriculum and other inservice courses for industrial arts teachers in the region interested in developing new competencies.

Recent and Anticipated Developments: Because of the changing nature of technology, the Department continues to place a high priority on faculty development. Faculty members attend and participate in educational and industrial workshops, seminars, and institutes to develop new competencies necessary to up-grade instructional strategies and content to keep pace with technological change. Through faculty development activities, the department has recently added courses and offered workshops in the areas of industrial safety, quality control, photo typesetting, digital logic, design of an electric vehicle, applied synthetics, motorcycle safety education, and microcomputer applications to the instructional program.

Another recent development has been the establishment of an Advisory Board for the Department of Industrial Technology in 1982. This group, composed primarily of individuals from business/industry and the education profession, is to assist in the improvement of the total program through an advisory role. The specific mission and functions of the board are:

Mission of Board:

1. Assessment and Review--to evaluate what is and recommend how to update, modify, expand and improve the quality of Industrial Technology programs.
2. Change Agent--to alert the Industrial Technology faculty of needed change for the purpose of maintaining program relevance. The Board may recommend new concepts, new technologies, and reveal changes as they take place in business/industry and/or education that should be reflected in the departments instructional program.
3. Communication Link--to establish a link of communication between business/industry and education. Effective communication is a two-way process to establish educational programs that serve a vital need in society. This may be accomplished through field experience or internship programs cooperatively designed by selected business/industry and the UND Industrial Technology faculty.

Function of the Board:

The function of the Advisory Board is to advise and assist the Industrial Technology faculty in such areas as:

1. Curriculum content advisement.
2. Equipment, facilities, and instructional resources review.
3. Business/Industry and education resource coordination.
4. Field experience/internship coordination and placement services.
5. Articulated preservice and inservice seminars and workshop activities.
6. Professional development activities.

Due to national changes in the professional terminology and increasing enrollment in the industrial technologist component of this department's dual-purpose program, there exists a need to more specifically prescribe the curriculum and courses. Historically, "industrial technology" was an umbrella term designated to describe all technically related programs that dealt with industry and its associated technologies. A common curriculum was used to prepare both industrial education teachers and technologists for industry. For the industrial technologist component, related courses in mathematics, computer science, management, engineering and others are taken by technology students through the advisement of the faculty. Graduates of either programs have had no difficulty securing positions in industry or in teaching.

During the 1960's, the term "industrial technology" became a specific program in many institutions of higher education designed to prepare industrial technologists for technical/supervisory positions in industry. By 1967, the National Association of Industrial Technology was organized to represent nationally and exclusively the associate, baccalaureate and masters level educational programs in Industrial Technology. This organization prescribes the specific curricula for accreditation of technologist programs.

The curricula combines liberal education with professional level technical emphasis in graphic communications, production (manufacturing/construction), and energy/power. The technical content is supported with general education and appropriate mathematics and science. In addition, coursework is required in industrial management, human relations, engineering, and computer science. The major goal of the industrial technology program is to provide industry with graduates as industrial technologists capable of making decisions in the production/supervisory area.

The most recent development in the Department of Industrial Technology at UND has been to investigate national trends of technologist programs with the anticipation of developing a prescribed curricula unique for the preparation of industrial technologist for industry. The curricula needs to be designed on a broad interdisciplinary approach built upon a balanced program of studies drawn from a variety of disciplines related to industry and its technologies.

Summary

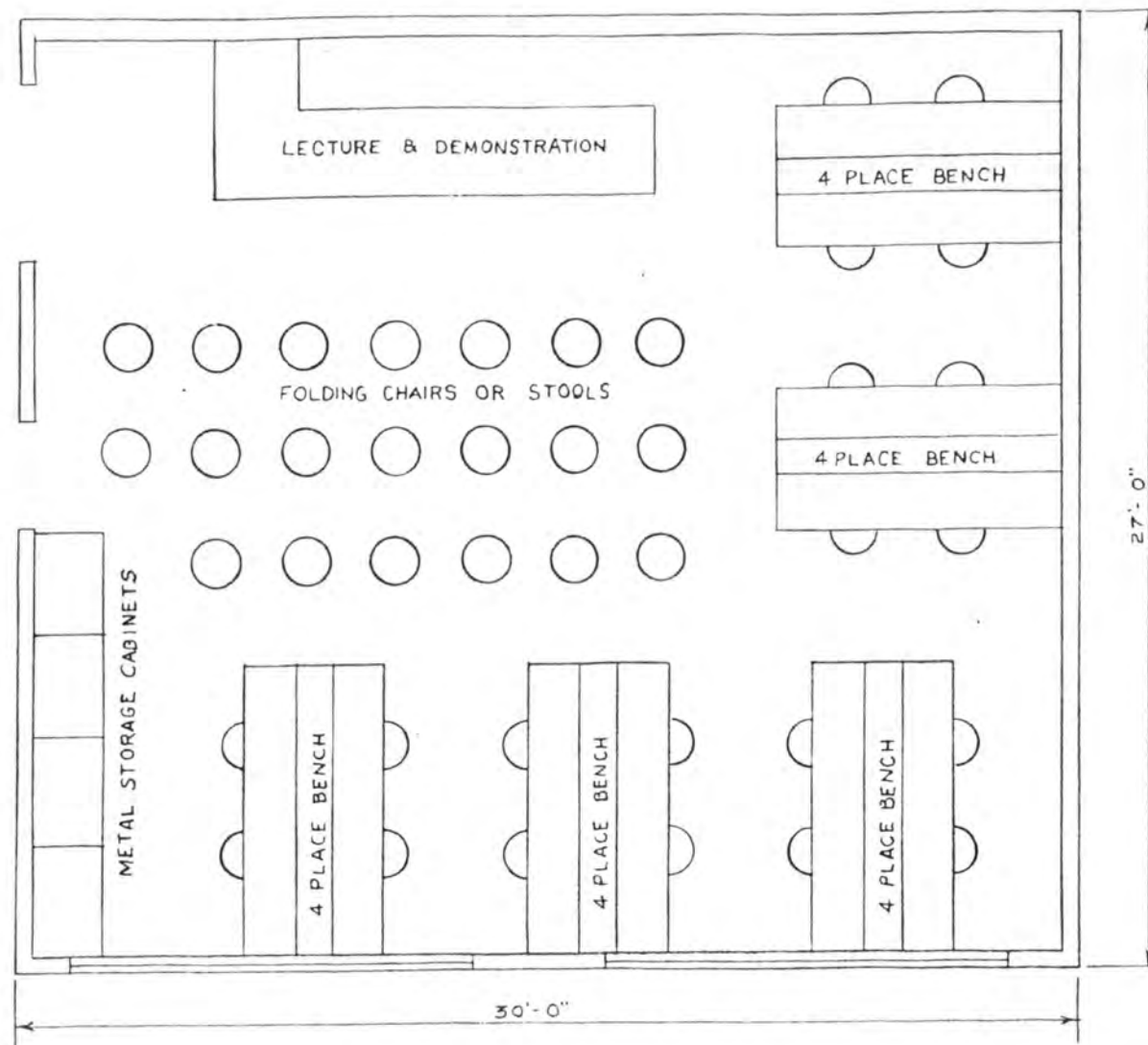
The Department of Industrial Technology has a long, rich history at the University of North Dakota. It has always kept pace with national trends as it moved from manual training to manual arts to industrial arts and more recently industrial technology. Because of its progressive program, it has established itself as a leading program within the profession. In addition, the faculty that have been associated with the department over the years have contributed significantly to national, regional and state professional organizations through membership, committee work and holding offices within the associated professional organizations.

The department has been fortunate in attracting faculty members who have been dedicated in advancing the profession of industrial arts teacher education and industrial technology throughout its long history. Their commitment to the program and continual strive to keep abreast of technical developments in a changing technological society have developed a program that has consistently prepared students well qualified to move into various careers in teaching, administration, and respected business and industrial positions.

As a result of the department's dedication to improving the teaching/learning process, it was recognized by the University of North Dakota at the 1982 Founders Day and was awarded the McDermott Award for Excellence in Teaching and Service.

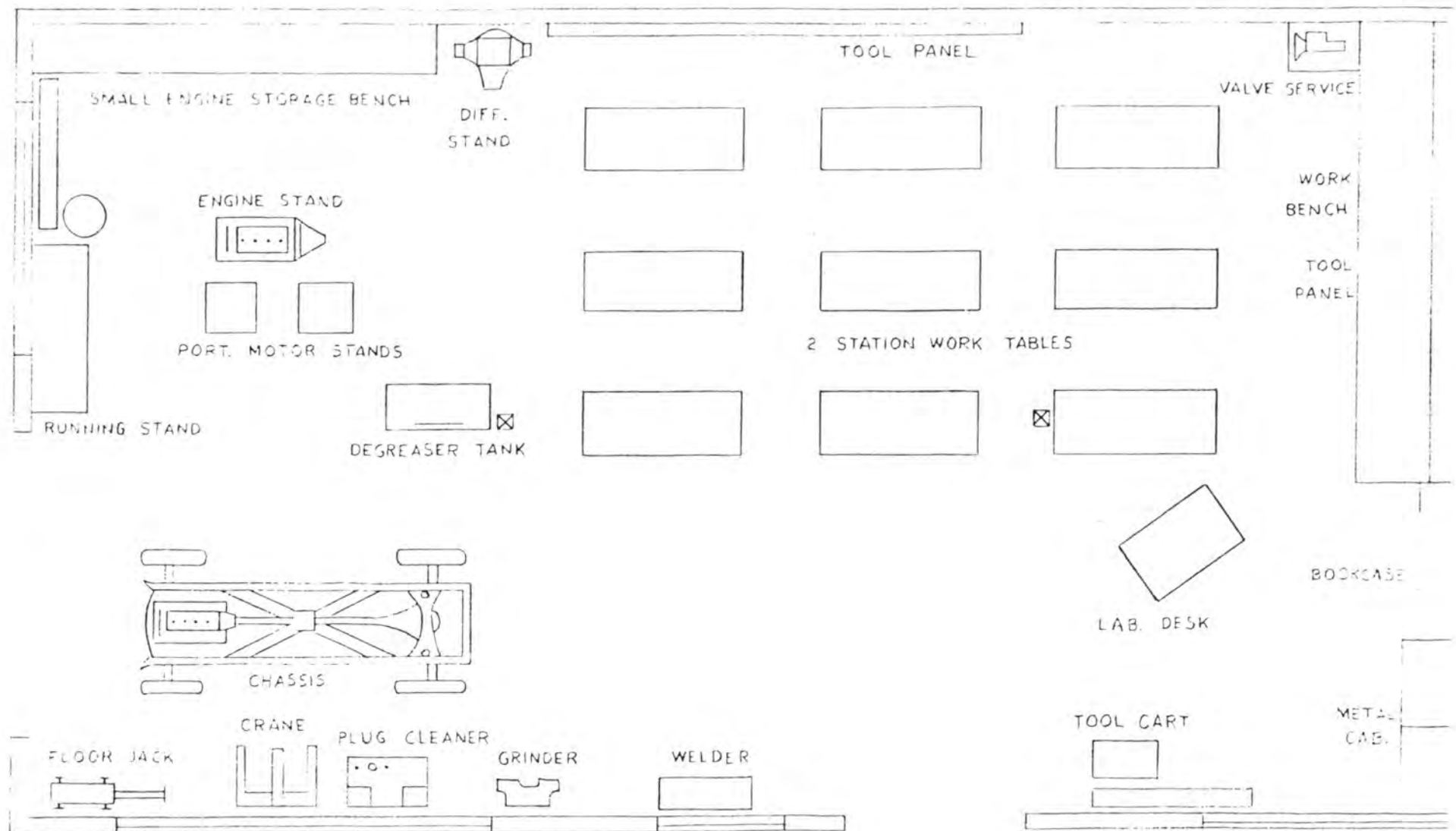
Appendix "A"

1963--Technical Area Layout Plans



SCALE $\frac{1}{4}" = 1'$

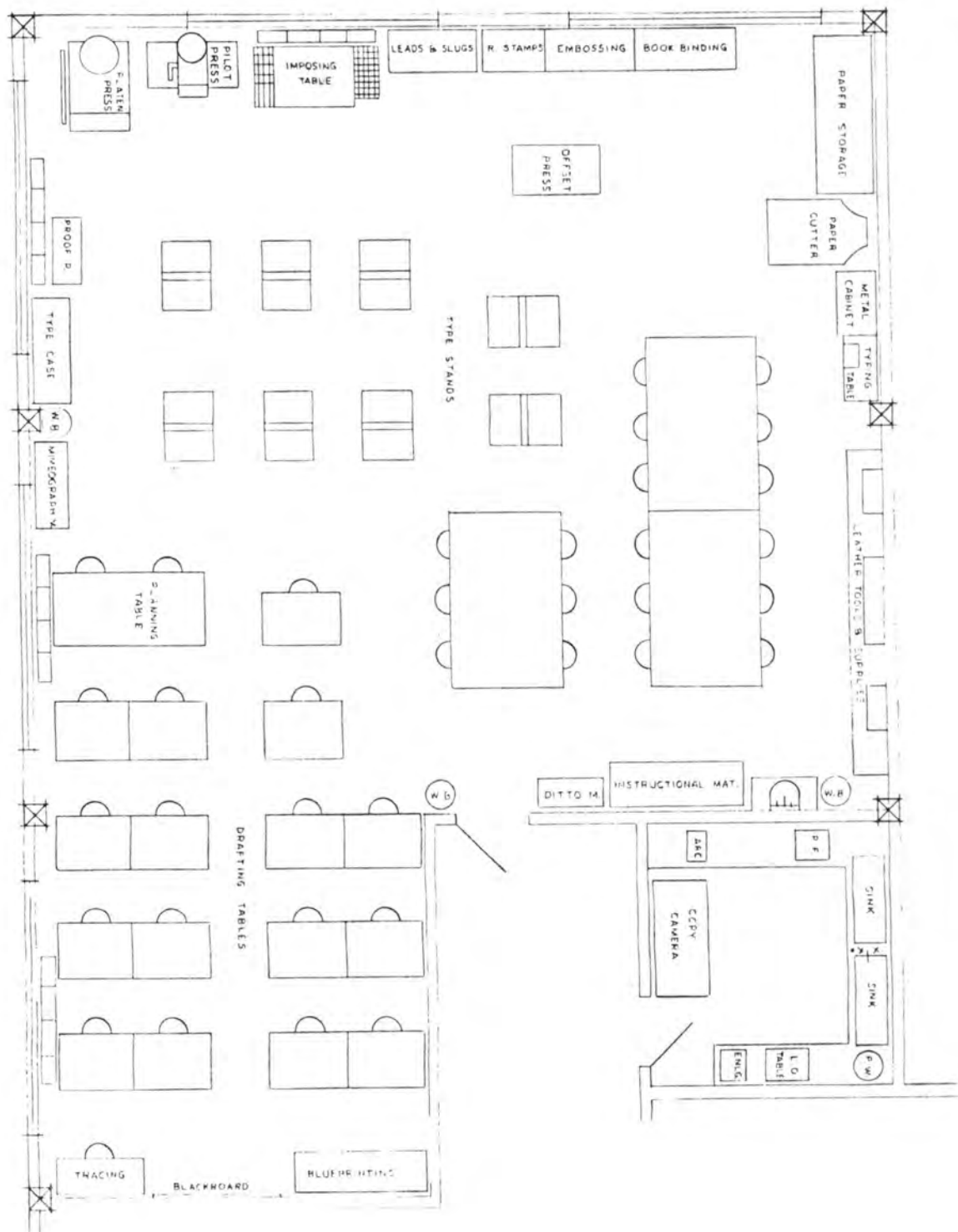
PROPOSED LAYOUT FOR ELECTRICITY-ELECTRONICS-CLASSROOM

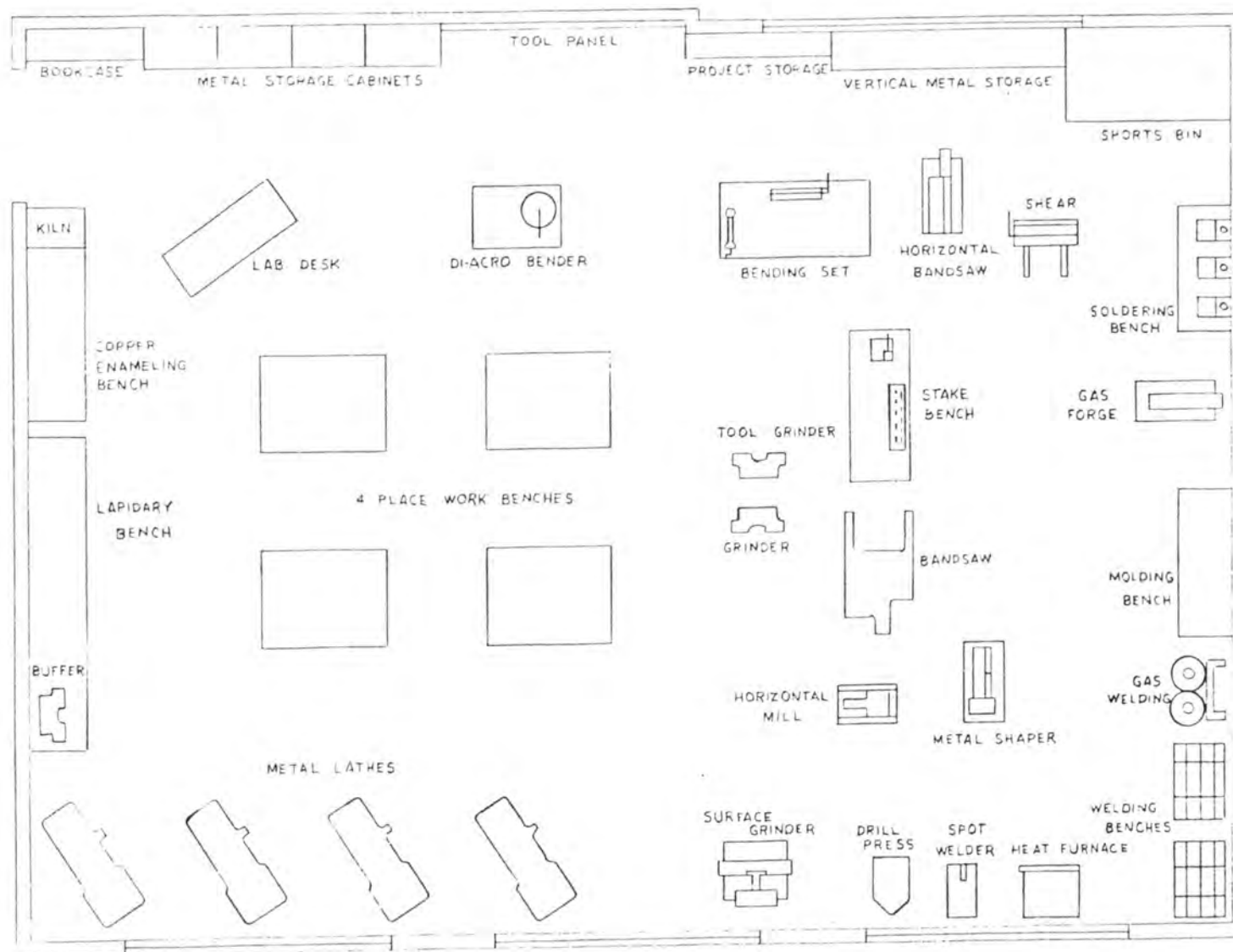


PROPOSED LAYOUT FOR POWER MECHANICS LAB.

PROPOSED LAYOUT & EQUIPMENT for DRAFTING-STAPHIC ARTS COMBINATION

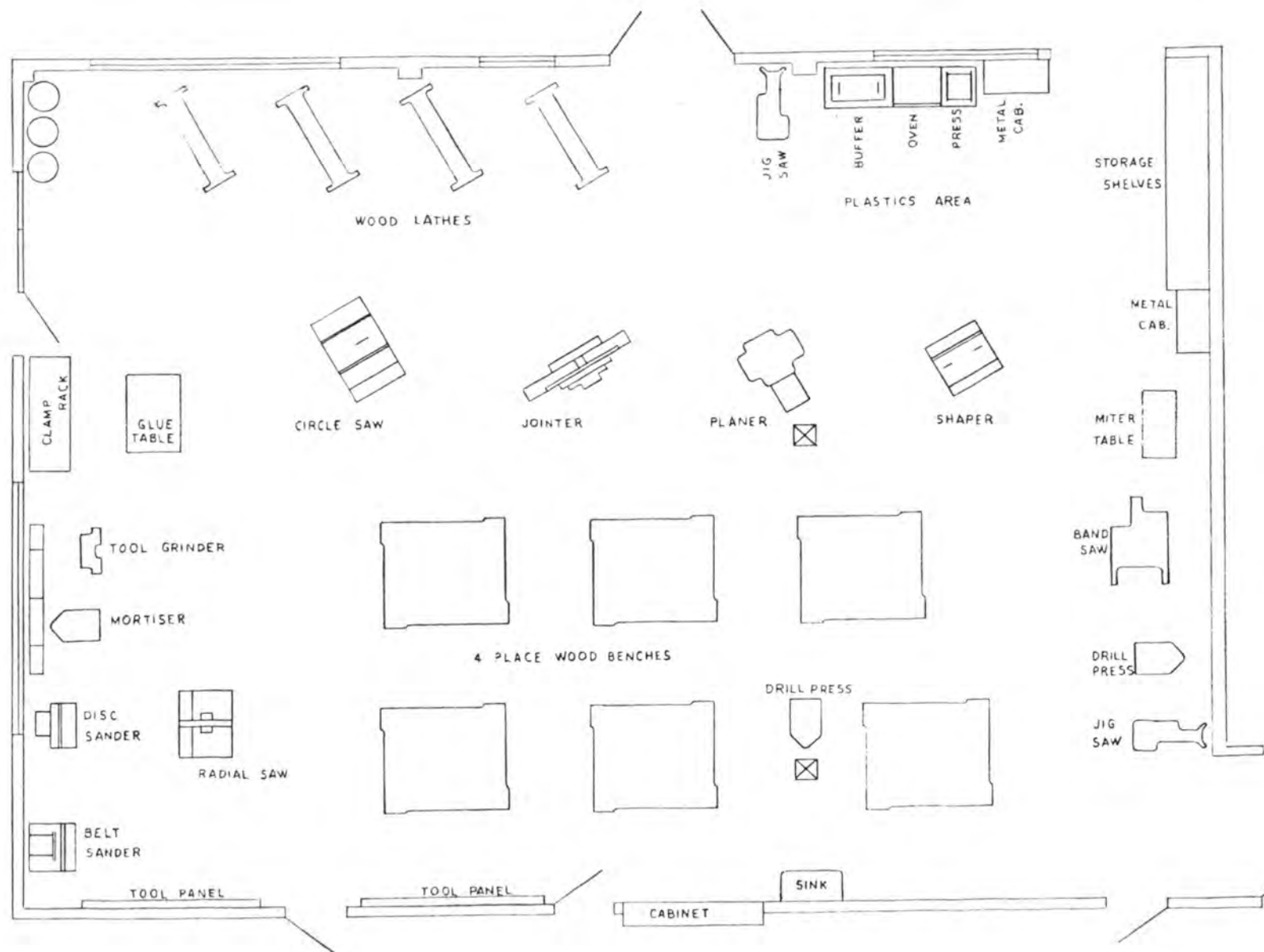
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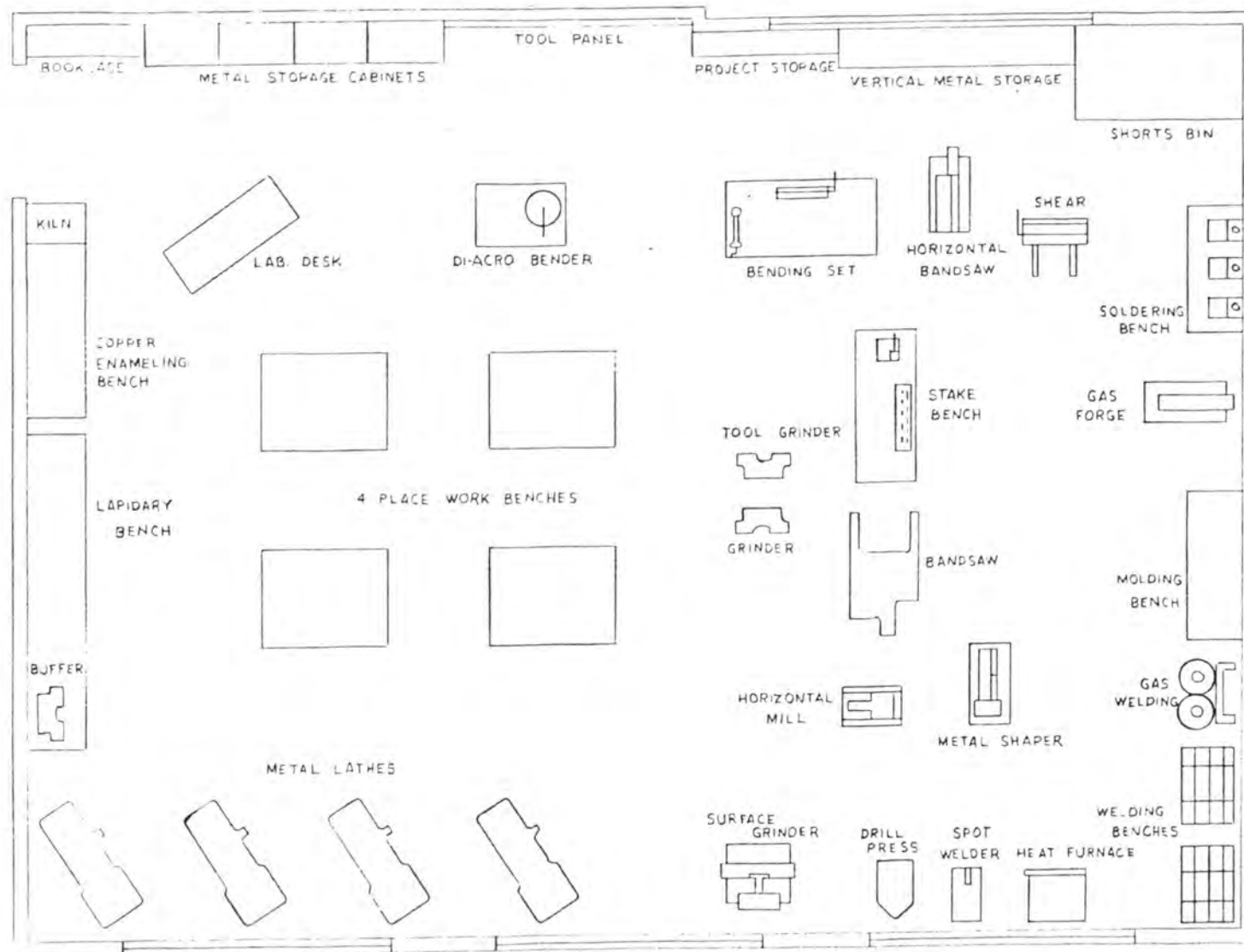


SCALE $\frac{1}{4}'' = 1'$

PROPOSED LAYOUT FOR GENERAL METALS LABORATORY



PROPOSED LAYOUT FOR GENERAL WOODS LABORATORY



SCALE $\frac{1''}{4} = 1'$

PROPOSED LAYOUT FOR GENERAL METALS LABORATORY

Appendix "B"

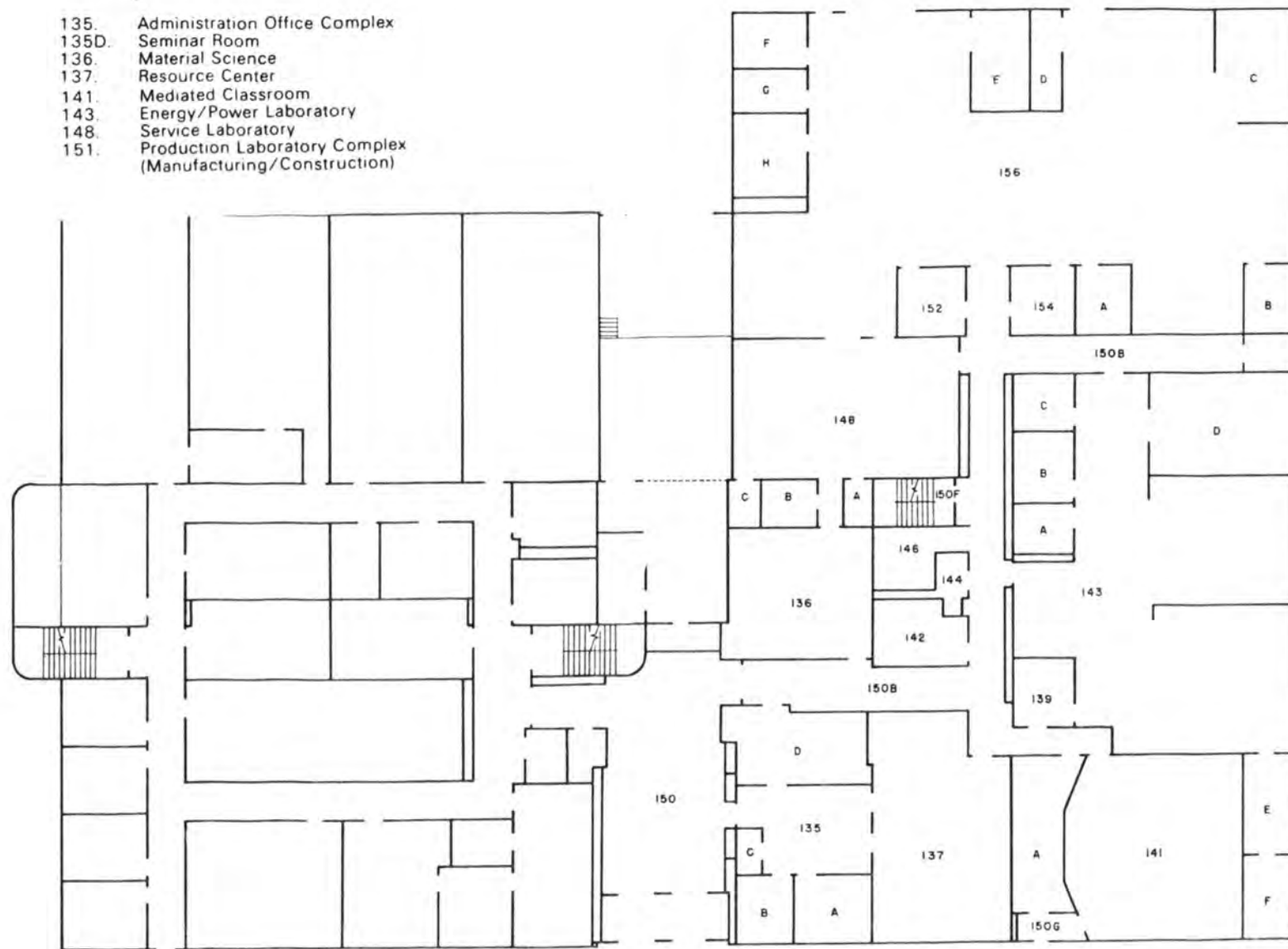
Physical Facility Layout Plan--1970

Appendix "C"

Industrial Technology Portion--Floor Plan

Starcher Hall--1981

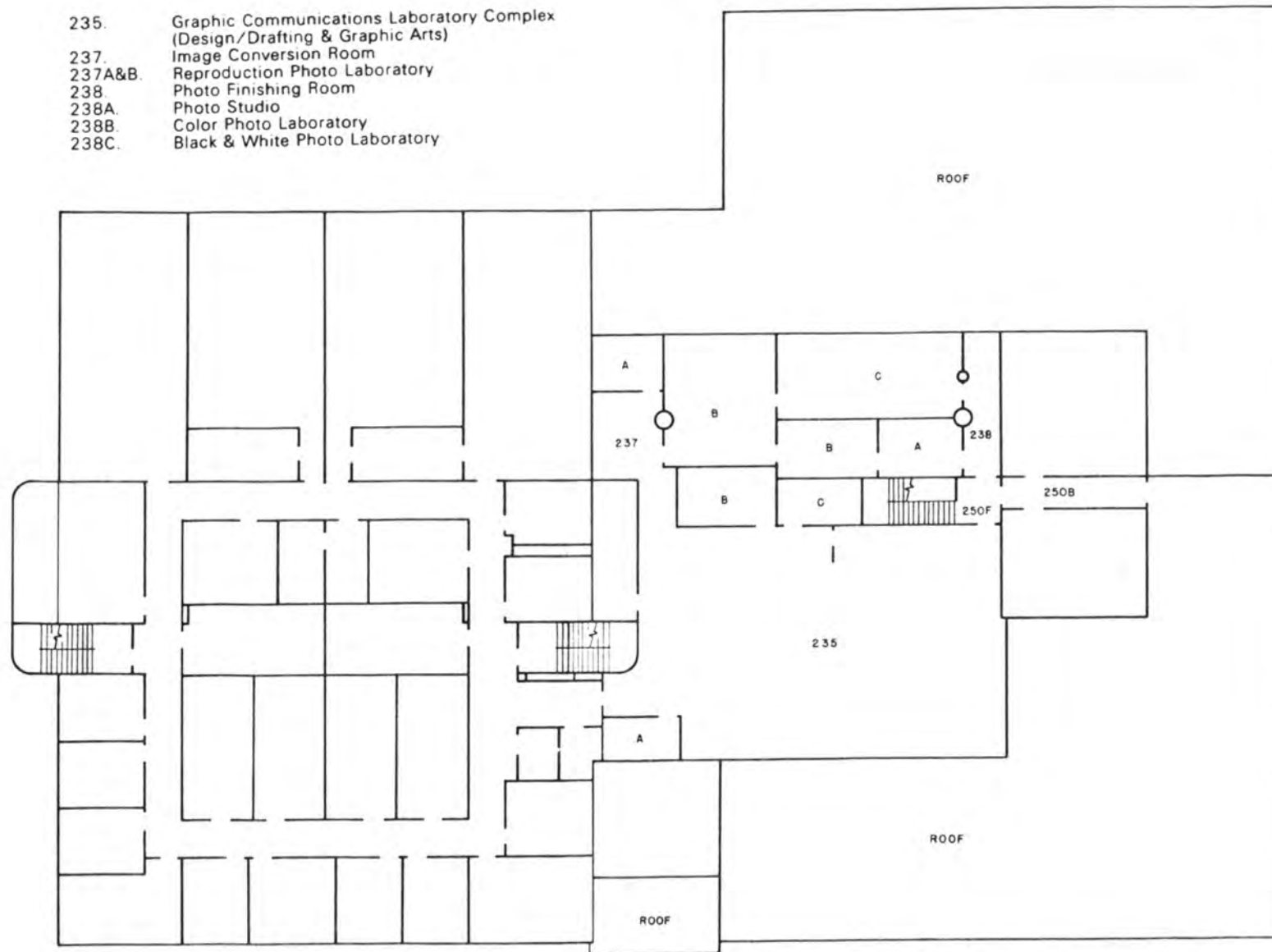
- 135. Administration Office Complex
- 135D. Seminar Room
- 136. Material Science
- 137. Resource Center
- 141. Mediated Classroom
- 143. Energy/Power Laboratory
- 148. Service Laboratory
- 151. Production Laboratory Complex
(Manufacturing/Construction)



Biology Portion

Industrial Technology Portion

- 235. Graphic Communications Laboratory Complex
(Design/Drafting & Graphic Arts)
- 237. Image Conversion Room
- 237A&B. Reproduction Photo Laboratory
- 238. Photo Finishing Room
- 238A. Photo Studio
- 238B. Color Photo Laboratory
- 238C. Black & White Photo Laboratory



Biology Portion

Industrial Technology Portion